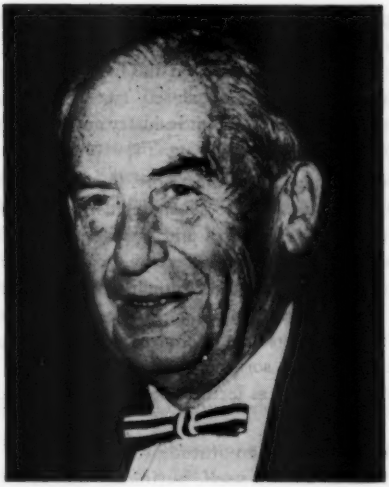
Journal of the Royal Society of Arts

NO. 5060 JULY 1961 VOL. CIX

AWARD OF THE ALBERT MEDAL FOR 1961



[*Keystone Press*

With the approval of H.R.H. the President, the Council has awarded the Albert Medal for 1961 to Professor Walter Gropius, Dr. Ing., F.I.A.A., Hon.R.D.I., 'for his contributions to architectural and industrial design'.

Walter Gropius's reputation as an architect was established on the Continent before the First World War, and during the last forty years, first at the Bauhaus in Germany, and subsequently in this country and the United States, his practice, teaching and writings have exercised a profound influence on the development and correlation of architecture and industrial design. In 1937 he was appointed Professor of Architecture at the Graduate School of Design, Harvard University, and in the following year became Chairman of the University's Department of

Architecture. Since 1952 he has been Professor Emeritus. His present practice in America is as a member of The Architects' Collaborative, a professional team which he founded.

Dr. Gropius received the Royal Gold Medal for Architecture at the R.I.B.A. in 1956. Amongst the many other distinctions which have been bestowed on him, it is appropriate to recall here his appointment as an Honorary Member of the Faculty of R.D.I. in 1947. Last year he was elected a Benjamin Franklin Fellow of the Society.

Mr. E. Maxwell Fry, C.B.E., F.R.I.B.A., a Member of Council of the Society, who worked for three years in partnership with Dr. Gropius, has contributed the following appreciation:

Dr. Walter Gropius is exactly fitted to be the recipient of the Albert Medal.

Before he set up in practice in Berlin in 1910 he had faced himself in the direction he was to take by becoming the chief assistant to Peter Behrens, the architect of the great Siemens concern. But the next year he surpassed his master entirely in the creation of a glass-enclosed factory for the Fagus Shoe-last Company that became at once a model for industry and a landmark in the evolution of a new architecture.

But he was not content to be an architect only. His aim was to humanize industry through art: to bring to industry the sensitive instrument of intuitive creation; to offer to art the materials, structures and processes of industry as being valid for all purposes. For the purpose of this task he created out of the School of Arts and Crafts and the Academy of Arts of Weimar what was known as the Bauhaus, for which in 1926 he built new buildings at Dessau; and brought with him a remarkable group of enthusiasts that included Paul Klee, Kandinsky, Baer and Moholy-Nagy—not at all the sort of people normally to be associated with a reforming architect but in fact as fertile a set of minds as it could be possible to imagine.

Between them all they defined an attitude that was neither one of art for art's sake nor of efficiency as an end in itself, but rather that of a creative intelligence working through the mechanistic recesses of industrial materialism towards a world of clear form in the image of the machine but with the proportions, texture and colour of art. Before darkness closed over Germany and drove Gropius and his collaborators westward, the ideas of the Bauhaus, bodied forth in practical examplar, had spread over the world as a release of creative energy that made further Bauhaus centres virtually unnecessary because a new aesthetic had been already perfected.

Walter Gropius's influence as a teacher and architect burgeoned again in America, which he made his home after his brief sojourn with us, and he is to-day one of the great formative influences in the modern world, respected and beloved. But it is the enduring impetus of his original creation at the Bauhaus in Germany that we most celebrate in offering the Award.

ANNUAL GENERAL MEETING

The Council hereby gives notice that, in accordance with the Bye-laws, the 207th Annual General Meeting of the Society, for the purpose of receiving the Council's report and the Financial Statements for 1960, for the Amendment of the Bye-laws, and for the Election of Officers, will be held on Wednesday, 28th June, 1961, at 3 p.m. at the Society's House.

(By Order of the Council)

KENNETH WILLIAM LUCKHURST,
Secretary

ANNUAL GENERAL MEETING

ELECTION OF OFFICERS

Acting under Bye-law 76, the Council has prepared a list of those persons whom they wish to nominate for election at the Annual General Meeting on the 28th June as President, Vice-Presidents, Treasurers and Ordinary Members of Council for the ensuing year. Since the exhibition of this list in the Library of the Society, an additional duly qualified person has been nominated to serve as an Ordinary Member of Council.

In accordance with Bye-law 79, therefore, the list of all persons duly nominated to fill the above offices is hereby published, and this list will form the balloting list at the Annual General Meeting:

Nominated by the Council:

PRESIDENT

His Royal Highness The Prince Philip, Duke of Edinburgh, K.G., K.T.

VICE-PRESIDENTS

Lord Bossom, LL.D., F.R.I.B.A.
Sir George Edwards, C.B.E., B.Sc., Hon.F.R.Ae.S., Hon.F.I.A.S. (President's nominee)
Sir Ernest Goodale, C.B.E., M.C., Hon.F.S.I.A., Compt.T.I.
Robert W. Holland, O.B.E., M.A., M.Sc., LL.D.
Sir Harry Lindsay, K.C.I.E., C.B.E.
Oswald P. Milne, F.R.I.B.A., J.P.
Lord Nathan, P.C., T.D., F.B.A., F.S.A.
The Earl of Radnor, K.G., K.C.V.O.
E. Munro Runtz, F.R.I.C.S.
Major-General Sir Harold Wernher, Bt., G.C.V.O., T.D., D.L. (President's nominee)
Brian O'Rorke, R.A., R.D.I., F.R.I.B.A. (Master of the Faculty of R.D.I.)
Professor Simon Lissim (Senior Honorary Corresponding Member in the U.S.A.)

ORDINARY MEMBERS OF COUNCIL

Sir Hilary Blood, G.B.E., K.C.M.G.
The Honble. G. C. H. Chubb, M.A.
Lord Conesford, Q.C.
Miss Sylvia Crowe, PP.I.L.A.
R. E. Dangerfield
Peter A. Le Neve Foster
E. Maxwell Fry, C.B.E., B.Arch., F.R.I.B.A.
John Gloag, Hon.A.R.I.B.A., Hon.F.S.I.A.
Stanley E. F. Gooding, M.A., M.Sc., M.D., J.P.
Milner Gray, R.D.I., PP.S.I.A.
Antony Hopkins
J. C. Jones, C.B.E., B.Sc., M.I.Mech.E., A.M.I.C.E.
Edgar E. Lawley
Sir Ronald Nesbitt-Hawes, C.B.E., E.D.
Paul Reilly, M.A., Hon.F.S.I.A.
Sir Gilbert Rennie, G.B.E., K.C.M.G., M.C.
A. R. N. Roberts
Sir Philip Southwell, C.B.E., M.C., B.Sc.
Professor S. Tolansky, Ph.D., D.Sc., F.R.S.
P. F. R. Venables, Ph.D., B.Sc., F.R.I.C.
Hugh A. Warren, M.Sc.(Eng.), M.I.C.E., M.I.Struct.E.
Miss Audrey Withers, O.B.E.
Sir Walter Worboys, B.Sc., D.Phil.

TREASURERS

F. A. Mercer, Hon.F.S.I.A.
G. E. Tonge, C.B.E.

Nominated by Sir Albert Richardson, K.C.V.O., PP.R.A., F.R.I.B.A., and Professor Hector Corfiato, F.R.I.B.A., F.S.A.:

ORDINARY MEMBER OF COUNCIL

Sidney Loweth, F.R.I.B.A., F.S.A.

PROPOSED AMENDMENT OF BYE-LAW 4

At the Annual General Meeting on 28th June the Council will propose to the Society the amendment of Bye-law 4 to provide for the signature of cheques on the Society's accounts in the absence of the Secretary. The amended Bye-law would read as follows (the alterations proposed being printed in italic type):

> All moneys, except investments, and except a sum not exceeding one hundred pounds for petty cash expenses, shall be kept at the bankers of the Society, in the name of the Corporate body, and except as provided hereunder payments thereout shall be made by cheques on such bankers, signed by either of the Treasurers, and countersigned by the Secretary *(or his deputy as authorized by the Council)*, for the discharge of such liabilities of the Society as shall severally exceed twenty-five pounds. A subsidiary banking account may be maintained at the Society's bankers and in the Society's name, by cheques signed as aforesaid by either of the Treasurers and countersigned by the Secretary *(or his deputy as authorized by the Council)*, and used for the following purposes only, viz.: the payment of cash wages, the purchase of postage and National Insurance stamps, and the payment of accounts severally not exceeding twenty-five pounds, the cheques for payments on such subsidiary account being signed by the Secretary *(or his deputy as authorized by the Council)*, and countersigned by the Accountant.

MEETING IN BIRMINGHAM

It was announced in the March issue of the *Journal* that a committee of Fellows of the Society living in the Midlands was arranging a programme of activities in that region for 1961. The first meeting organized by the Committee—a visit to the Barber Institute of Fine Arts—has already taken place. A second will be held on Thursday, 12th October, at the College of Advanced Technology, Gosta Green, Birmingham 4, when an illustrated lecture on 'The New Birmingham' will be delivered by Mr. A. G. Sheppard Fidler, F.R.I.B.A., the City Architect.

Light refreshments will be served in the Byng Kenrick Suite of the College from 6.15 p.m., and the lecture will begin at 7 p.m. The meeting is open to all Fellows of the Society and members of their families, and admission will be by ticket costing 6*s* for each Fellow or relative. Applications for tickets, together with the appropriate remittances, should be addressed to The Very Reverend the Provost, Provost's Lodge, St. Philip's Place, Birmingham 3, and should reach him by 15th September at the latest.

VISIT OF PROFESSOR SIMON LISSIM

It is worthy of record that Professor Simon Lissim, Senior Honorary Corresponding Member in the U.S.A., who last year was elected a Vice-President of the Society, was present at the Meeting of Council held on 12th June. It will be recalled that the first Honorary Corresponding Member to become a Vice-President was the late Colonel W. J. Brown of Canada. Colonel Brown, however, was never able to attend a Council Meeting, and Professor Lissim is the first overseas Vice-President to have done so.

THE SOCIETY'S CHRISTMAS CARD

The Christmas Card for 1961 has been designed by Mr. Edward Bawden, C.B.E., R.A., R.D.I., and its subject is the International Exhibition of 1862, with which the Society was closely concerned. An illustration of the card will be published in a later issue of the *Journal*. Meanwhile, a full description, and details of prices, will be found on the form at the back of the present issue, and overseas Fellows in particular may wish to take this early opportunity of placing their orders. It is hoped that the cards will be ready for distribution by the end of September.

NEW LIST OF FELLOWS

The List of Fellows, corrected to the beginning of April, 1961, has been reprinted, and copies may be obtained free of charge on application to the Registrar.

MEETING OF COUNCIL

A meeting of Council was held on Monday, 12th June. Present: Mr. Oswald P. Milne (in the Chair); Mrs. Mary Adams; Sir Hilary Blood; Lord Bossom; the Honble. G. C. H. Chubb; Lord Conesford; Mr. R. E. Dangerfield; Sir George Edwards; Mr P. A. Le Neve Foster; Mr. E. Maxwell Fry; Mr. John Gloag; Professor R. Y. Goodden; Dr. Stanley Gooding; Dr. R. W. Holland; Mr. J. C. Jones; Mr. Edgar Lawley; Sir Harry Lindsay; Professor Simon Lissim; Mr. F. A. Mercer; Lord Nathan; Mr. Paul Reilly; Mr. A. R. N. Roberts; Mr. G. E. Tonge; Mr. Hugh A. Warren; Sir Harold Wernher, and Miss Anna Zinkeisen; with Mr. G. E. Mercer (Deputy Secretary) and Mr. J. S. Skidmore (Assistant Secretary).

ELECTIONS

The following candidates were duly elected Fellows of the Society:

Aisher, Richard Barr, B.A., Speldhurst, Kent.
Baragwanath, Wilfred Eric, Wirral, Cheshire.
Bayldon, Richard Oliver Maxwell, Oakham, Rutland.
Berryman, Derek James, A.T.D., N.D.D., Chingford, Essex.
Bird, Miss Wendy, Cheltenham, Glos.
Blood, Stanley Graham, Lagos, Nigeria.
Brittain, Reginald Douglass Wordsworth, M.A., Halifax, Yorkshire.
Bullock, Harold, Iver, Bucks.
Cargill, Angus Gordon, B.E.M., St. Leonards-on-Sea, Sussex.
Champagne, André, B.A., L.Sc.Nat., Montreal, Quebec, Canada.
Clarke, Miss Doris Mary, Worcester Park, Surrey.
Curran, Peter, Oldham, Lancashire.
Delany, Desmond Joseph, Kampala, Uganda.
Griffiths, Miss Rose Elizabeth, A.R.C.A., M.S.I.A., London.
Groulx, Adélard, M.D., M.P.H., Montreal, Quebec, Canada.
Harris, Henry Leslie, London.
Hayward, Mrs. Freda Anne, Cheadle Hulme, Cheshire.
Hoar, Harold Frank, Ph.D., F.R.I.B.A., A.M.T.P.I., Woking, Surrey.
Horner, John Ronald, L.R.A.M., L.G.S.M., L.T.C.L., Belfast.
Isermann, Mrs. Centa, Summit, New Jersey, U.S.A.
Jones, John Francis d'Enfer, A.R.I.N.A., M.S.I.A., Woodbridge, Suffolk.
MacDonald, Alastair James, Hatfield, Hertfordshire.
Mitchell, Ian Hay, B.Eng., Saint John's, Newfoundland, Canada.
Motilla, Agustin Martin, Dr. Eng., Bucaramanga, Colombia, South America.
Parker, George Ernest, Manchester.
Peachey, Albert Henry, London.
Pritchard, Stephen Owen, B.E.M., London.
Ramsdale, Henry, Darlington, Co. Durham.
Rotinoff, Miss Margarita (Mrs. D'Janoeff), Windsor, Berkshire.
Singleton, Geoffrey, M.A., B.Litt., Bowness-on-Windermere, Westmorland.
Sowle, Frederick William, Dorking, Surrey.
Thomson, Kenneth Roy, M.A., Toronto, Ontario, Canada.
Wellspring, Roy Henry, London.

The following candidates were duly elected Associates of the Society as winners of Industrial Art Bursaries in 1960:

Bartlett, David Arthur, Virginia Water, Surrey.
Van Schalkwyk, Peter John, N.D.D., Newcastle-on-Tyne.

The following Companies were duly admitted into Association with the Society:

English Clays Lovering Pochin & Co. Ltd., St. Austell, Cornwall.
The United Steel Companies Ltd., Sheffield.

ALBERT MEDAL FOR 1961

The Albert Medal for 1961 was awarded to Professor Walter Gropius. (See separate Notice on p. 553.)

BICENTENARY MEDAL FOR 1961

Agreement was reached on the award of the Bicentenary Medal for 1961.

ROYAL DESIGNERS FOR INDUSTRY

On the recommendation of the R.D.I. Joint Committee, two new appointments to the distinction of R.D.I., and one new appointment to the honorary distinction of R.D.I., were made. Consideration was also given to proposals for celebrating, in the autumn of 1961, the twenty-fifth anniversary of the institution of the distinction.

VACANCIES ON COUNCIL

It was reported that Miss Sylvia Crowe, Sir Ronald Nesbitt-Hawes, Dr. P. F. R. Venables, Miss Audrey Withers and Sir Walter Worboys had accepted nomination for election as Members of Council; and that Mr. Sidney Loweth had been nominated for election as a Member of Council under Bye-law 78.

EXAMINATIONS

It was reported that 268,905 entries had been received for the Summer series of examinations, an increase of 40,039 over the corresponding figure for the previous year. The total of 456,774 for examination entries in the present session exceeded the record figure reached in 1959/60 by 46,854.

ANY OTHER BUSINESS

A quantity of financial and other business was transacted.

FINANCIAL STATEMENTS FOR 1960

The following statements are published in accordance with Section 25 of the Society's Bye-laws

BALANCE SHEET, 31st December, 1960

1959		£	£
	General Fund Accounts—		
	General Purposes Capital Account per annexed account		
81,307	(page 564)	85,683	
6,008	Dr. Cantor's Bequest	6,008	
2,548	Lord Bennett's Bequest	2,548	
7,468	Henry Morley's Bequest	7,468	
2,196	Dorothy Corfield's Bequest	2,196	
500	J. A. Milne's Bequest	500	
	Life Composition Account (page 564):		
	Unexpired balance of compositions received on the basis of taking credit for such compositions over		
12,188	a period of 12 years from their receipt	13,144	
112,215			117,547
	Specific Fund Accounts (page 564)—		
31,248	Premises Purchase Fund Account	36,620	
741	Premises Maintenance Fund Account	330	
9,233	Amount accumulated towards pensions payable under Modified Superannuation Scheme	9,008	
735	*Provision for Rehabilitation of Building including £500 gift in memory of the late Lord Amulree*	—	
435	Industrial Art Bursaries Fund Account	107	
—	Staff Benevolent Fund	100	
32,392			46,165
9,500	**Mortgage**—6/8 John Adam Street		9,000
	Other Liabilities—		
13,839	Creditors	13,848	
6,323	Industrial Art Bursaries awarded (but not expended)	6,912	
	Uninvested Trust Capital :		
1	Cadman Memorial Fund	1	
1,047	Dr. Swiney's Bequest	83	
2,494	Unexpended Trust Income (page 566)	2,702	
181	Contributions received for Industrial Art Bursaries to be awarded in 1961	411	
23,935			23,959
178,042	Carried forward		196,671

		£	£	1959 £
	General and Specific Fund Assets—			
	Freehold Property, 6/8 John Adam Street			
	Cost in 1922, plus additions, *less* sales and compensation received		49,788	*49,788*
	Note : Expenditure in connection with adjoining Leasehold Property has been written off in previous years to Capital Account.			
	Pictures, Books, Furniture and Fixtures (as fixed in 1919 : subsequent additions have been written off) ...		10,000	*10,000*
	Investments :			
	Freehold Ground Rents, at cost	983		*1,229*
	Securities (page 565) :			
	General (Market Value £44,114—1959 £37,881)	55,597		*45,684*
	Dr. Cantor's Bequest (Market Value £3,810—1959 £4,355)	5,941		*5,941*
	Lord Bennett's Bequest (Market Value £1,634—1959 £1,867)	2,548		*2,548*
	Henry Morley's Bequest (Market Value £4,790—1959 £5,474)	7,468		*7,468*
	Dorothy Corfield's Bequest (Market Value £1,387—1959 £1,585)	2,151		*2,151*
	J. A. Milne's Bequest (Market Value £384—1959 £438)	500		*500*
	Premises Purchase Fund (Market Value £28,606—1959 £17,831)	28,550		*16,500*
	Held towards meeting pensions payable under Modified Superannuation Scheme (Market Value £6,942—1959 £7,368)	8,238		*8,238*
	Fund for Rehabilitation of Building	—		*2,500*
			111,976	*92,759*
			171,764	*152,547*
	Stocks of Stationery and Working Papers of Examinations Department at value estimated by the Society's printer	3,805		*5,410*
	Debtors and Payments in Advance	8,032		*5,698*
	Short Term Loan to Local Authority	5,000		—
	Balances with Bankers and Cash in Hand	8,070		*14,387*
			24,907	*25,495*
	Carried forward		196,671	*178,042*

1959				1959			
£		£	£	£		£	£
178,042	Carried forward		196,671	Carried forward		196,671	178,042

BALANCE SHEET, 31st December, 1960—*continued*

1959					1959			
£		£	£		£	£	£
178,042	Brought forward			196,671	Brought forward		196,671	178,042
	Trust Fund Accounts—				**Trust Fund Assets—**			
33,188	Capital Account : Balance at 31st December, 1959 ...	33,452			Capital : Investments (page 565) :			
264	*Add :* Profit on Sale of Freehold Ground Rents ...	247			Freehold Ground Rents, at cost ...	572		721
—	Edmund Rich Memorial Fund	500			Securities (Market Value £22,790—1959 £23,683)	32,541		30,683
33,452		34,199			Cottages at Drayton St. Leonard ...	1,000		1,000
3,327	Unexpended Income (net)	3,535				34,113		32,404
36,779			37,734		Uninvested Funds	86		1,048
						34,199		33,452
					Income : Investments (page 566) :	£ 833		833
					(Market Value £680—1959 £778)			
					Due from the Society	2,702		2,494
						3,535		3,327
							37,734	36,779

Notes :

(1) Credit has been taken for the whole of the subscriptions received during the year, although some relate to periods expiring after the date of the Balance Sheet, but no credit has been taken for subscriptions due but unpaid at 31st December, 1960.

(2) The balances standing to the credit of the various Fund Accounts are subject to the market value of the relative investments, the majority of which are dated stocks.

On behalf of the Council

OSWALD P. MILNE, *Chairman.*
F. A. MERCER, } *Treasurers.*
G. E. TONGE, }

£214,821	£234,405	£234,405	£214,821

Report of the Auditors to the Council and Fellows of the Royal Society of Arts.

We have examined the above balance sheet and annexed income and expenditure account which in our opinion respectively give a true and fair view of the state of the affairs of the Society at 31st December, 1960, and of its income and expenditure for the year ended on that date according to the best of our information and the explanations given to us and as shown by the books.

5 London Wall Buildings,
London, E.C.2.
5th June, 1961.

DELOITTE, PLENDER, GRIFFITHS & CO., *Chartered Accountants.*

INCOME AND EXPENDITURE ACCOUNT

for the Year ended 31st December, 1960

EXPENDITURE

1959		£	£
£			
	Printing and Publishing *Journal*—		
6,062	Printing and Paper	6,866	
1,477	Postages	1,692	
709	Reviews and other expenses	419	
8,248			8,977
554	Library—Books, etc.		457
119	Cost of Albert and Society's Medals and R.D.I. Expenses		134
	Industrial Art Bursaries—		
200	Contribution to Fund...	200	
404	Expenses of Competition	609	
604			809
195	Cantor and Morley Lectures		135
	Examination Expenses (other than salaries and wages)—		
28,376	Examiners' Fees and Expenses	34,722	
15,529	Stationery and Printing Materials	21,488	
3,305	Rent and Rates	3,369	
1,327	Printing Department Expenses other than materials	1,818	
3,633	Postages, Carriage and Telephone	4,865	
2,989	Lighting, Heating, Cleaning, Office Equipment and other expenses	3,304	
1,183	Prizes and Certificates	1,266	
430	Invigilators' Fees and Expenses	554	
773	Proportion of House and Office Expenses as below...	929	
57,545			72,315
67,265	Carried forward		82,827

INCOME

1959		£	£	£
£				
	Annual Subscriptions received during year		23,120	21,763
	Registration Fees		1,084	907
	One-twelfth of Life Compositions received during twelve years to date		2,244	2,159
	Income from—			
	Ground Rents	41		45
	General Fund Investments	1,711		1,711
	Dr. Cantor's Bequest	212		212
	Lord Bennett's Bequest	91		91
	Henry Morley's Bequest	266		266
	Dorothy Corfield's Bequest	77		76
	J. A. Milne's Bequest	21		21
	Trust Funds for General Purposes	251		270
	Bank and Deposit Accounts...	469		304
			3,139	2,996
	Sales of *Journal*, etc.	849		784
	Advertisements in *Journal*	3,417		791
			4,266	1,575
	Examination Fees	114,544		94,553
	Sales of Examination Papers and Advertisements ...	7,158		6,141
			121,702	100,694
	Rents, etc. (including £2,837 charged to Examinations Department)		12,682	12,364
	Carried forward		168,237	142,458

1959		£	£
£			
67,265	Brought forward		82,827
42,319	Salaries, Wages and Superannuation Scheme		46,546
8,862	Rent Payable		8,870
621	Interest on Mortgage		589
	House and Office Expenses—		
1,497	Rates and Insurance	1,855	
465	Repairs, Renewals and Decorations...	507	
600	*Restoration of Paintings*	—	
3,040	Lighting, Heating, Cleaning, Expenses of Meetings and General Charges	3,111	
2,124	Stationery, Printing, Postages, Telephone, Audit and Accountancy and other Office Expenses ...	3,816	
7,726		9,289	
773	*Less :* Proportion (10 per cent.) allocated to Examinations above	929	
6,953			8,360
1,327	Pensions	1,418	
519	*Less :* Charged against Modified Superannuation Scheme Fund Account	519	
808			899
1,500	Annual transfer to Premises Maintenance Fund Account		1,500
5,000	Annual transfer to Premises Purchase Fund Account ...		5,000
	Balance of Income dealt with as follows :—		
4,565	One-half carried to Premises Purchase Fund Account	6,823	
4,565	One-half carried to General Purposes Capital Account	6,823	
9,130			13,646
£142,458			£168,237

1959		£	£
£			
67,265	Carried forward		82,827
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8,862	Rent Payable		8,870
621	Interest on Mortgage		589
	House and Office Expenses—		
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3,040	Lighting, Heating, Cleaning, Expenses of Meetings and General Charges	3,111	
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7,726		9,289	
773	*Less :* Proportion (10 per cent.) allocated to Examinations above	929	
6,953			8,360
1,327	Pensions	1,418	
519	*Less :* Charged against Modified Superannuation Scheme Fund Account	519	
808			899
1,500	Annual transfer to Premises Maintenance Fund Account		1,500
5,000	Annual transfer to Premises Purchase Fund Account ...		5,000
	Balance of Income dealt with as follows :—		
4,565	One-half carried to Premises Purchase Fund Account	6,823	
4,565	One-half carried to General Purposes Capital Account	6,823	
9,130			13,646
£142,458			£168,237

1959		£	£
£			
67,265	Brought forward		82,827
42,319	Salaries, Wages and Superannuation Scheme		46,546
8,862	Rent Payable		8,870
621	Interest on Mortgage		589
	House and Office Expenses—		
1,497	Rates and Insurance	1,855	
465	Repairs, Renewals and Decorations...	507	
600	*Restoration of Paintings*	—	
3,040	Lighting, Heating, Cleaning, Expenses of Meetings and General Charges	3,111	
2,124	Stationery, Printing, Postages, Telephone, Audit and Accountancy and other Office Expenses ...	3,816	
7,726		9,289	
773	*Less :* Proportion (10 per cent.) allocated to Examinations above	929	
6,953			8,360
1,327	Pensions	1,418	
519	*Less :* Charged against Modified Superannuation Scheme Fund Account	519	
808			899
1,500	Annual transfer to Premises Maintenance Fund Account		1,500
5,000	Annual transfer to Premises Purchase Fund Account ...		5,000
	Balance of Income dealt with as follows :—		
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4,565	One-half carried to General Purposes Capital Account	6,823	
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519	*Less :* Charged against Modified Superannuation Scheme Fund Account	519	
808			899
1,500	Annual transfer to Premises Maintenance Fund Account		1,500
5,000	Annual transfer to Premises Purchase Fund Account ...		5,000
	Balance of Income dealt with as follows :—		
4,565	One-half carried to Premises Purchase Fund Account	6,823	
4,565	One-half carried to General Purposes Capital Account	6,823	
9,130			13,646
£142,458			£168,237

GENERAL PURPOSES CAPITAL ACCOUNT
for the Year ended 31st December, 1960

1959		£		£	1959
£					£
10,000	Amount transferred to Premises Purchase Fund Account	2,500	Balance at 31st December, 1959 ...	81,307	86,371
			Ancient Lights Compensation... ...	—	322
			Proceeds of Sale of Books from Library	4	6
—	Amount transferred to Staff Benevolent Fund Account	100	*Donation*	—	21
			Sales of "History of the R.S.A." ...	49	22
			Profit on Sale of Ground Rents ...	100	—
81,307	Balance per Balance Sheet	85,683	Amount transferred from Income and Expenditure Account	6,823	4,565
£91,307		£88,283		£88.283	£91,307

LIFE COMPOSITION ACCOUNT for the Year ended 31st December, 1960

1959		£		£	1959
£					£
	Amount taken into the Society's Income—				
	One-twelfth of Compositions received during twelve years to		Balance at 31st December, 1959 ...	12,188	11,617
2,159	date	2,244	Compositions received during year ...	3,200	2,730
12,188	Balance per Balance Sheet	13,144			
£14,347		£15,388		£15,388	£14,347

SPECIFIC FUND ACCOUNTS for the Year ended 31st December, 1960

1959		£	£	1959
£	**Premises Purchase Fund Account—**			£
—	Balance at 31st December, 1959 ...	21,248		
	Amounts transferred from :			
10,000	General Purposes Capital Account £2,500			
1,452	*Fund for House Extension* ... —			
9,565	Income and Expenditure Account 11,823			
21,017		14,323		
216	Interest on Investments	986		
15	Contributions	63		
£21,248	Balance at 31st December, 1960 ...	£36,620		
	Premises Maintenance Fund Account—			
—	Balance at 31st December, 1959 ...	741		
	Add : Amounts transferred from :			
—	Provision for Rehabilitation of Building... 710			
1,500	Income and Expenditure Account 1,500			
		2,210		
1,500		2,951		
759	*Deduct :* Expenditure charged against Fund	2,621		
£741	Balance at 31st December, 1960 ...	£330		
	Amount accumulated towards pensions payable under Modified Superannuation Scheme—			
9,457	Balance at 31st December, 1959 ...	9,233		
295	*Add :* Interest on Investments ...	294		
9,752		9,527		
519	*Deduct :* Proportion of Pensions paid during year ...	519		
£9,233	Balance at 31st December, 1960 ...	£9,008		
	Provision for Rehabilitation of Building—			
760	Balance at 31st December, 1959 ...	735		
75	*Add :* Interest on Investment ...	75		
835		810		
100	*Deduct :* Repairs and Renewals charged against Fund ...	100		
£735		£710		
—	Balance transferred to Premises Maintenance Fund Account ...	£710		

		£	£	1959
	Industrial Art Bursaries Fund Account—			£
	Balance at 31st December, 1959 ...		435	338
	Contributions from Trust Funds :			
	Art Congress Studentship	—		150
	Owen Jones Memorial Fund	—		125
		—		275
	Contribution from the Society	200		200
	Other Contributions ...	4,297		4,047
			4,497	4,522
			4,932	4,860
	Deduct : Bursaries awarded for 1960	4,825		4,425
	Pamphlets and other expenses ...	609		404
		5,434		4,829
	Less : Pamphlets and other expenses charged against Income and Expenditure Account	609		404
			4,825	4,425
	Balance at 31st December, 1960 ...		£107	£435
	Fund for House Extension—			
	Balance at 31st December, 1959 ...		—	1,428
	Deposit Interest		—	24
			—	£1,452
	Balance transferred to Premises Purchase Fund Account... ...		—	£1,452
	Staff Benevolent Fund Account—			
	Amount transferred from :			
	General Purposes Capital Account		£100	—

INVESTMENTS

31st December, 1960

		Cost
Society		£
£5,000	British Transport 3 per cent. Stock 1978/88	4,820
£10,000	3½ per cent. Conversion Stock 1969	10,189
£24,370	British Electricity 4¼ per cent. Stock 1974/79	25,871
£7,000	2½ per cent. Consolidated Stock	4,804
£10,000	Jamaica Government 6½ per cent. Stock 1978/80	9,913
		£55,597
Dr. Cantor's Bequest		Cost
£6,048	3½ per cent. Funding Stock 1999/2004	£5,941
Lord Bennett's Bequest		Cost
£2,593	3½ per cent. Funding Stock 1999/2004	£2,548
Henry Morley's Bequest		Cost
£7,603	3½ per cent. Funding Stock 1999/2004	£7,468
Dorothy Corfield's Bequest		Cost
£2,202	3½ per cent. Funding Stock 1999/2004	£2,151
J. A. Milne's Bequest		Cost
£609	3½ per cent. Funding Stock 1999/2004	£500
Premises Purchase Fund		Cost
1,250	I.C.I. Ltd. £1 Ordinary Shares	£2,469
£2,615	London County Council 5 per cent. Stock 1980/1983	2,512
£4,950	5½ per cent. Conversion Stock 1974	5,019
£3,323	New Zealand 4½ per cent. Loan 1970/1973	3,000
£2,000	5 per cent. Defence Bonds	2,000
£1,500	Somerset County Council 5½ per cent. Mortgage Loan	1,500
2,060	Westminster Bank Ltd. £1 "A" Ordinary Shares	4,990
2,345	Distillers Co., Ltd., 10/– Ordinary Shares	4,560
£2,500	3 per cent. Savings Bonds 1960/70	2,500
		£28,550
Modified Superannuation Scheme		Cost
£4,709	4 per cent. Funding Stock 1960/90	£4,709
£1,536	3 per cent. Funding Stock 1959/69	1,529
£2,000	3 per cent. Savings Bonds 1960/70	2,000
		£8,238

			Cost or value when received in trust
Trust Funds			
Dr. Aldred Trust.			
£142	3½ per cent. Funding Stock 1999/2004		£140
Art Congress Studentship			
£1,495	3½ per cent. Funding Stock 1999/2004		1,469
R. B. Bennett Empire Prize Trust.			
£1,463	3½ per cent. Funding Stock 1999/2004		1,437
Sir George Birdwood Memorial Fund.			
£678	3½ per cent. Funding Stock 1999/2004		666
Selwyn Brinton Trust.			
£1,013	3½ per cent. Funding Stock 1999/2004		995
Alfred Davies Bequest.			
£1,988	3½ per cent. Funding Stock 1999/2004		1,953
Le Neve Foster Trust.			
£372	3½ per cent. Funding Stock 1999/2004		366
John Fothergill Trust.			
£251	3½ per cent. Funding Stock 1999/2004		247
Thomas Gray Memorial Trust.			
Capital Account :			
£9,048	3½ per cent. Conversion Stock 1961 or after	£7,000	
£1,174	3½ per cent. War Stock 1952 or after	995	
£212	British Transport 3 per cent. 1978/88	179	
£760	3½ per cent. Funding Stock 1999/2004	730	
Income Account : £475 3½ per cent. Funding Stock 1999/2004		383	
			9,287
Howard Trust.			
£472	3½ per cent. Funding Stock 1999/2004		463
Owen Jones Memorial Trust.			
£480	3½ per cent. Funding Stock 1999/2004		472
Neil Matheson McWharrie Trust.			
£338	3½ per cent. Funding Stock 1999/2004		332
Dr. Mann Trust.			
£949	3½ per cent. Funding Stock 1999/2004		932
Mulready Trust.			
£102	3½ per cent. Funding Stock 1999/2004		100
North London Exhibition Trust.			
£135	3½ per cent. War Stock 1952 or after		185

INVESTMENTS—*continued*

Sir William J. Pope Memorial Fund.			
£345 3½ per cent. Funding Stock 1999/2004			£339
Russian Embassy Prize.			
£92 3½ per cent. Funding Stock 1999/2004			91
Benjamin Shaw Trust.			
£86 3½ per cent. Funding Stock 1999/2004			85
John Stock Trust.			
£64 3½ per cent. Funding Stock 1999/2004			63
Dr. Swiney's Bequest.			
Freehold Ground Rents	£572		
£5,391 3½ per cent. Funding Stock 1999/2004	5,082		
£1,359 London County Council 6 per cent. Stock 1976/79	1,358		
		7,012	
Trueman Wood Lecture Endowment Fund.			
£860 3½ per cent. Funding Stock 1999/2004			844
Cadman Memorial Fund.			
£358 3½ per cent. Funding Stock 1999/2004			351
Thomas Holland Trust.			
£414 3½ per cent. Funding Stock 1999/2004			406
E. Frankland Armstrong Trust.			
£527 3½ per cent. Funding Stock 1999/2004			518
Joseph Paxton Memorial Trust.			
£1,147 3½ per cent. Funding Stock 1999/2004			1,127
A. C. Bossom Lecture Endowment Fund.			
£585 3½ per cent. Funding Stock 1999/2004			575
Fred Cook Memorial Lecture Fund.			
£1,008 3½ per cent. Funding Stock 1999/2004			1,000
Fred Henry Andrews' Bequest.			
£1,252 3½ per cent. Funding Stock 1999/2004			1,000
James Cranstoun Bequest.			
Capital Account : £556 Agric. Mortgage Corpn. 4½ per cent. Deb. Stock 1961/91	£541		
Cottages—Drayton St. Leonard	1,000		
Income Account : £605 3½ per cent. Funding Stock 1999/2004	450		
		1,991	
Edmund Rich Memorial Fund.			
£517 5 per cent. Conversion Stock 1971			500
			£34,946
Representing : Capital Account			34,113
Income Account			833
			£34,946

TRUST INCOME AND EXPENDITURE
for the Year ended 31st December, 1960

	Unexpended Income 1st Jan. 1960	Income received during year.	Expenditure on lectures, prizes and administration.	Amount applied to Society's General Purposes.	Unexpended Income carried forward 31st Dec. 1960.
	£	£	£	£	£
Dr. Aldred Trust	39	5	—	—	44
Art Congress Studentship	47	52	5	—	94
R. B. Bennett Empire Prize Trust	169	51	108	—	112
Sir George Birdwood Memorial Fund	143	24	32	—	135
Selwyn Brinton Trust	427	35	1	—	461
Alfred Davies Bequest	—	70	—	70	—
Le Neve Foster Trust	13	13	11	—	15
John Fothergill Trust	39	18	25	—	32
Thomas Gray Memorial Trust	623	407	307	—	723
Howard Trust	46	16	51	—	11
Owen Jones Memorial Trust	57	17	1	—	73
Neil Matheson McWharrie Trust	21	12	1	—	32
Dr. Mann Trust	—	36	36	—	—
Mulready Trust	14	3	—	3	14
North London Exhibition Trust	114	5	—	—	119
Sir William J. Pope Memorial Fund	57	12	16	—	53
Russian Embassy Prize	61	4	1	—	64
Benjamin Shaw Trust	7	3	—	—	10
John Stock Trust	61	2	—	—	63
Dr. Swiney's Bequest	40	218	—	178	80
Trueman Wood Lecture Endowment Fund	26	30	33	—	23
Cadman Memorial Fund	53	13	16	—	50
Thomas Holland Trust	24	14	15	—	23
E. Frankland Armstrong Trust	42	18	1	—	59
Joseph Paxton Memorial Trust	301	40	118	—	223
A. C. Bossom Lecture Endowment Fund	41	21	16	—	46
Fred Cook Memorial Lecture Fund	67	36	27	—	76
Fred Henry Andrews' Bequest	146	43	2	—	187
James Cranstoun Bequest	649	81	27	—	703
Edmund Rich Memorial Fund	—	11	1	—	10
	£3,327	£1,310	£851	£251	£3,535

Represented by : Amount due by Society 2,702
Balance invested as above 833
£3,535

WELFARE AND THE ENGLISH SCHOOL

The First Edmund Rich Memorial Lecture by

W. F. HOUGHTON, M.A.,

Education Officer, London County Council, delivered to the Society on Wednesday, 1st March, 1961, with Sir Griffith Williams, K.B.E., C.B., in the Chair

THE CHAIRMAN: We are met this afternoon to hear the Inaugural Lecture of the Edmund Rich Memorial series. I have one great qualification for taking the Chair, perhaps only one, and that is that I knew Edmund Rich probably longer than most people in this hall and certainly better. I yield to none in my intense admiration for that great man. He had a wonderful devotion to education, he was a cheerful and bright soul and above all he had a brilliant gift for friendship. The number of his friends was enormous, and here, if you won't think it wrong, I should like to interject a reference to the tremendous gift which Edmund owed to his wife. I remember walking to Beckenham Station with him a few months before he died after I had been visiting them. He said to me, 'Well G.G., whatever I may have done in life and whatever success I may have had, the greatest day in my life was the one when I met the lady who was going to be my future wife'. Anyone who knows Mrs. Rich knows what an enormous debt Edmund owed to her.

We are extremely glad to have Mr. Houghton, the Education Officer of the L.C.C., with us; there could be nobody better qualified to talk, he is the lineal descendant of Edmund Rich and on his own merit he has made his mark in the educational world. He has a formidable job. Because of the colossal superficial area of the L.C.C., and because of the great complexity of its system and above all because of the political set-up of the Council, he has to have the zeal of a pioneer, the skill of an administrator, and the patience of Job. I have no doubt that Houghton has got it. There was a time, I do not think it is any secret, when in official quarters London was regarded as the Cinderella in education; when any select list of authorities was made up, with a smile we dismissed London—it was just not there. But that is now all gone, and I think we owe the change to some of the bright Education Officers that have been with the L.C.C. in the last fifteen to twenty years. I can assure you from what I do know that Houghton has kept up that growing and improving tradition. So it is therefore most appropriate that we have Mr. Houghton here to talk on a subject which I am perfectly certain would have been very near to Edmund's own heart.

The following lecture was then delivered.

THE LECTURE

It is a great privilege to be invited to give the first Memorial lecture dedicated to the name of the late Edmund Rich. For thirty-five years he held important and exacting offices in the education service of the London County Council, during the last seven of which he was the Chief Officer of that service. In a turbulent and changing world it is the common lot of mortals to experience sudden reversals of fortune. Edmund Rich was no exception. Twice in his lifetime, through the

impact of war, he was compelled to contemplate the possible disintegration of the system of education, to the construction of which he had made a great contribution, and twice he was able to see it rehabilitated, revitalized and launched upon new and expanding lines of development. And throughout his career he was, of course, subjected to recurrent economy epidemics which are endemic in English education. But since he was an administrator, more especially since he was an educational administrator, it was his duty and his responsibility to ensure to the best of his ability the continuity of the service, to make such virtue as was possible out of dire necessity and to plan, optimistically, for the future whilst contending with the problems and pessimisms of the present. He discharged these duties and responsibilities faithfully and well.

I have been asked, in this first lecture, to comment upon the welfare of young people within the pattern of education. It is appropriate that I should do so. To Edmund Rich the 'pastoral' aspect of his work as an educational administrator was of the first importance. He was, of course, right. This is the root of the matter. In a human service like that of education which touches so closely and so directly upon the hopes, the aspirations and the futures of a multitude of individual men, women and children, the educational administrator must endeavour to see, beyond his plans, procedures and regulations, the human beings for whose enrichment these are but the means towards the end. Whilst, necessarily and inevitably, he is concerned with issues of general relevance he must consider and, if possible, make provision for special, individual problems. He must certainly endeavour sympathetically to solve, wholly or partially, these problems. He will, of course, never completely succeed; but at least he can try and in trying he can console himself with the reflection that he may well be laying up golden treasure in heaven whilst undergoing harsh criticism upon earth.

Edmund Rich returned to London in 1905 to be a Senior Officer in the newly formed Education Department of the London County Council. It is tempting, therefore, to draw a comparison between the picture as it was in 1905 and as it is to-day. There are, however, dangers in this method of treatment. The Ancients placed their golden age in the past; at the end of last century social reformers put theirs in the future. The belief in the inevitability of progress which is implicit in Macaulay's famous Third Chapter of his *History of England* was given more dogmatic form by Herbert Spencer who declared that 'Progress is not an accident but a necessity. What we call evil and immorality must disappear. It is certain that man must become perfect.' It is doubtful if to-day this optimistic belief in the inevitability of progress and the perfectibility of man would be universally accepted. But more than half a century ago it was the mainspring of reform and drew its strength and certainty from the advances made in science and technology; from a belief that man was a rational being; and that education would enable him to exercise his reason and so solve the many problems and alleviate the many hardships and anomalies that so clearly existed in and afflicted the world.

I do not propose to paint a dark picture of the scene in 1905 for the purpose of contrasting it with the brightness of the scene in 1961. Nor do I propose to give encouragement to those who complain that affairs were ordered better in the good

old days than they are in the present. My purpose is to mention briefly and undramatically some aspects of the education service where significant changes took place, both materially and in methods of approach, between 1905 when Edmund Rich joined the London Education Service and 1940 when he left it.

To-day it probably appears to be in the natural order of things that a child should, while still at school, periodically pass under the eye of school doctors, dentists and nurses; that he should, if found to require it, receive medical or dental treatment at a clinic maintained by the Local Education Authority; that after illness he should be sent for a spell to a seaside recuperative holiday home and perhaps spend a few terms in a residential school for delicate children; that, if he develops difficult behaviour symptoms, he should be referred to a child guidance clinic and possibly from there to a school for the maladjusted; that he should be provided with mid-morning milk and a school dinner at mid-day; that he should be fitted out by his education authority with boots and clothing if his parents cannot afford to send him to school warm and dry; that he should be advised at school how to join an evening play centre or enrol in a youth club; that he should have his 'bus or train fare paid if he lives more than the prescribed distance from the school of his parents' choice; that he should be interviewed in school about choice of employment and have a job suggested to him when he leaves; or, if he does not leave at the statutory age, that he should become eligible for a maintenance allowance to help his parents to keep him on to the end of his course if their income falls below certain prescribed limits; and that this should be followed by a county major award if he achieves a place in a university or an institution of further education. For a large proportion of the child population, too, facilities will be afforded to go out once a week to a playing field to be taught the skills of the various games and sports; to attend concerts given by first rank orchestras; to see plays at the Old Vic, ballet at Sadler's Wells and opera at Covent Garden; to go with their school fellows on a school journey, perhaps abroad.

All or nearly all these services grew up between 1905 and 1940. They reflect the widening scope and significance of the Education Service; the increasing knowledge of child development and a recognition of the importance of understanding it; the trend towards a 'child-centred' education; the welding together of public and private enterprise; the lengthening of school life and the expansion of educational opportunities thereafter; the development of a relationship between home and school in which the one complements without substituting for the other. During this period also the conception of education as a continuous process emerged and was given form in the three great Reports of the Consultative Committee of the Board of Education: *The Education of the Adolescent*, *The Primary School* and *Infant and Nursery Schools*. Alongside the established system of elementary education an expanded system of secondary education was built up by the Local Education Authorities and new forms of post-primary education were being established in the Central and Junior Technical schools. The demand for a genuine system of secondary education for all gathered weight and momentum during the years between the wars until it culminated in the Education Act of 1944, a system of secondary education for all which, as Professor Tawney wrote, 'would enable us

to forget the tedious vulgarities of income and social position in a common affection for the qualities which belong not to any class or profession of men but to man himself'.

In 1905, however, all these developments lay in the future. The task immediately in hand was formidable in the extreme. The Education Act, 1902, had placed firmly in the hands of the County and County Borough Councils responsibility for maintaining and developing all the growing public education services. 'For the first time', wrote Mr. Sidney Webb, 'the Bill definitely includes as a public function education as education, not primary education only, or technical education only but anything and everything that is education from the kindergarten to the university. This renders the Bill of 1902 epoch-making in the history of English education.' A year later the Education (London) Act transferred the powers of the London School Board to the London County Council, which also assumed responsibility for maintaining the voluntary schools and retained the responsibility for higher education which for 11 years it had exercised through the Technical Education Board. This meant the control and maintenance of 521 Board Schools with an average attendance of some 485,000 children, 438 voluntary schools with 175,000 children; special schools with 5,000 blind, deaf and defective children; 356 domestic economy centres; 196 manual training centres; 373 evening schools with 145,000 students and 9 industrial schools. To these responsibilities must be added the rapidly expanding work and commitments of the Technical Education Board. 'To the London County Council', wrote Mr. Sidney Webb, 'is given the power and duty subject to few conditions and practically no limitations of equipping London with a complete educational system.' This was the task facing the Council when Edmund Rich joined his chief, Sir Robert Blair in 1905.

It is true that London had been more fortunate than other areas in that the greater part of her educational provision had been controlled for a third of a century by a body big enough to think boldly for her future. This body, the School Board for London, had done a tremendous job of school building. It had built 203 schools between 1870 and 1880, 151 more between 1881 and 1890, and 115 more between 1890 and its extinction in 1904. These were the Board Schools about which Mr. Sherlock Holmes discoursed so eloquently and optimistically during a train journey from Woking to Waterloo; the big, isolated clumps of buildings, rising up above the slates like brick islands in a lead-coloured sea, which he described as light-houses—beacons of the future, capsules with hundreds of bright little seeds in each, out of which would spring the wiser, better England of the future. He was not alone in the faith he pinned to these schools and to the power of education which they represented. For they had already shown what they could do. The School Board had found wide areas of London hardly as yet touched by any civilizing influence and had begun the work of civilizing them. It had encountered widespread hostility to compulsory school attendance and had forged a system to enforce it. By 1905 only 2,479 children could be recorded as being 'out of school for want of accommodation, or of suitable accommodation', although another 4,378 were recorded as being 'too ill or delicate to be in attendance', and 1,148 blind, deaf, defective or crippled children were noted as 'temporarily out of school'.

Perhaps more encouraging, there were no 'half-timers' in London and only about 1,000 London children a year were being allowed to leave school at 12, by passing the 7th standard at a special examination held by H.M. Inspectors.

Classes, however, were very large and it was not until 1909 that the Board of Education required that the maximum number of pupils on the register of any class under one teacher should not exceed 60. Moreover, although 98 per cent of 12,000 teachers in the 'Board' schools held certificates, only 51 per cent of the 4,400 in the non-provided schools were certificated. In both groups a high proportion had obtained certificates on examination, after a period of service as untrained teachers without attendance at a training college.

The Technical Education Board had also been active. A conspectus of its work can be gained from its final report in 1904. It had found the volume and character of the instruction in chemistry, electricity, art and technological subjects available for the population of London meagre in the extreme, and had multiplied and strengthened it at every point. In this it had received valuable assistance from the City Parochial Charities, which devoted £50,000 a year to the establishment and maintenance of polytechnics. The number of polytechnics and technical institutes had risen from eight to twenty-six. The number of day classes had been trebled in ten years, while the number of student hours worked by evening students of mechanical and electrical engineering, carpentry and joinery, plumbing and building, experimental physics, chemistry and mathematics, had increased four-fold. The London Day Training College and the Central School of Arts and Crafts had been provided, and monotechnics set up for photo-engraving and lithography, carriage-building, typography, leather dyeing and tanning. Fifty laboratories, twenty-five science lecture rooms and eighteen workshops had been created for boys' secondary schools, and the whole character of the rather arid and lifeless teaching of science and botany in girls' secondary schools had been changed by similar measures.

Most important of all had been the establishment of a scholarship scheme designed to form a link between the elementary and the secondary schools and graded to afford opportunities for elementary school pupils to proceed to institutions of higher education. In 1892 for an elementary school roll of over 600,000 in London, the number of scholarships held at any one time was 1,000, many of them fettered with local restrictions, many of them inadequate. As the Crowther Report says, 'The door was not closed to a poor boy of talent but it was not open very far. Jude was still likely to remain obscure.' Within 11 years, however, the Technical Education Board were awarding 600 junior county scholarships, 100 intermediate scholarships for pupils between 16 and 19 years of age, 45 senior scholarships and exhibitions, 60 art scholarships and some 800 scholarships for those undertaking continued or technical education. The door had, at any rate, been opened a little wider. It was the task of the administrators of 1905 to open it even more widely and to expand even more rapidly the facilities for technical education in face of the challenge from Germany, to which the establishment of the German Empire in 1870 had awakened this country. As G. M. Young wrote in his classic study of *Victorian England*: 'Over all these late Victorian years hovers the airy and

graceful spirit of the School Inspector, ingeminating *Porro unum est necessarium:* organize your secondary education; and in the background, at the end of every avenue stands the lonely and uncomprehended figure of the Prince Consort, surrounded by the Commissioners of the Great Exhibition of 1851.'

It is because we are still even now only in process of organizing our secondary education and because even now, belatedly, we are only in process of developing and expanding our technical education to meet new and even more formidable challenges that I shall resist the temptation to draw complacent comparisons between then and now. The goal is still far from being reached; but if we stand nearer to it than our predecessors did in 1905, much of the credit is due to their courage, their determination and their faith.

There were other and, perhaps, more serious and intractable problems facing the administrators of 1905. The social conditions in London and elsewhere in this country at the beginning of the century have been too often described for repetition. The London School Board had done much to bring civilization into the jungle which it had found. But there was still much to be done. Education alone was not sufficient for immediate transformation although in the long-term its effects were likely to be decisive. By the end of the last century, it was evident that many children were being prevented by physical weakness or defect from receiving full or, indeed, any benefit from their education. It was the poor quality of recruits for the Boer War, however, which finally aroused the public conscience and gave the spur to action. From the Reports of the Inter-departmental Committee on Physical Deterioration (1904) and the Inter-departmental Committee on Medical Inspection and Feeding of Children (1905) stem the School Health Service and the provision of school milk and meals. It may well be, also, that indirectly to the effects of these Reports can be traced the gradual but consistent interest and improvement in the educational provision for handicapped children which is, perhaps, the most human and most enlightened development during the last half-century.

In 1890 the London School Board had appointed its first medical officer and in 1902 established a school medical department under Dr. James Kerr, from Bradford, the first full-time school medical officer appointed by an education authority. His first annual report, like the early reports of school medical officers, dentists and nurses in the records of the Medical Branch of the Board of Education, is a revealing document. Beyond the extensive record of malnutrition, emaciation, uncleanliness, defective eyesight, decayed teeth, ringworm, chronic ear-diseases, impetigo and other distressing afflictions, one can see the grim and exacting task which had been assigned to the teachers. One can also understand why the struggle to improve the physical condition of the children and the social setting which marked and marred them assumed, perhaps, greater proportions than the effort to inculcate the elements of literacy. It is to the lasting credit of the teachers of those early days that they faced their unpromising task with courage and wrought minor miracles of social amelioration. To many voluntary workers, also, must go great credit and respect. The Inter-departmental Committee of 1905 showed that over 150 voluntary organizations were active in London for the relief of under-feeding

among schoolchildren. There were six main societies in London, including the East Lambeth Teachers' Association and the London School Dinners Association. The Second Report of the London School Board's Joint Committee on Under-fed Children, published in 1902, quoted a weekly average of over 20,000 children receiving meals. This Joint Committee had been established in 1900 following upon special investigations made by the London School Board in 1889, 1895 and 1899 into the extent of the problem. Relief Committees were established in 1899 in each 'necessitous' school to draw up lists of necessitous children and to apply to the appropriate charitable agency for funds. These Relief Committees were reconstituted in 1907 as Children's Care Committees. The Care Committees still make a unique and invaluable contribution to the welfare of London children; they still represent that felicitous conjunction of voluntary and statutory enthusiasm and endeavour which it would be unwise to regiment and unfortunate to destroy. It is not surprising that enlightenment and enterprise refused to be confined to the narrow, though important, limits of school meals. In an interesting book on Children's Care Committees published in 1909, Miss Margaret Frere, a member of the Education Committee of the London County Council described the task of the Care Committee Worker. She, herself, had worked in the schools in Seven Dials since 1898, when she had formed a Care Committee on her own initiative and set to work to discover what causes produced under-fed children. In her book, she says: 'Children often have the appearance of being under-fed when really they are suffering from unsuitable feeding, want of sleep and overwork out of school-hours. In the majority of cases parental neglect is the source of their misery and only by getting at the parents can their condition be improved.' Again, 'The school must not be treated as a little world, cut off from all intercourse with the life around it; to be understood, it must be studied with, not apart from, the district in which it stands, where are the homes from which the children come and the workshops and places where their parents are employed.' Miss Frere may have been an original, as she was certainly a most eloquent, voice over half a century ago, but the London Care Committee Service has undoubtedly developed and contributed as she would have wished it to do; that is, towards the ideal of a healthy family life and social well-being. It is concerned not only with the provision of meals and milk; not only with ensuring that children have their ailments properly treated; not only that they should be adequately clothed and shod; not only that they should have a proper period of convalescence after illness; not only that they should be given the appropriate educational provision if they suffer from any handicap. It is a liaison service between home and school, between home and doctor. Clearly, it is essential that both the school and the medical service should be aware of the environment and the social circumstances which influence the physical condition and behaviour of the child; clearly it is essential that the parent should understand the importance of what is proposed for the welfare of his child and be persuaded of the need for his co-operation. It has been said that 'Education is supremely a social, not a solitary, process. We must think, therefore, not of isolated individuals developing, as it were, *in vacuo* but of children set in societies living within the framework of the various groups in whose life they are nurtured.'

It is the function of the Care Committees, in conjunction with other agencies, to contribute towards an understanding of the influences affecting child-growth and development, and towards that close relationship between school and home which enables the one to complement the other, and both to exert a wise and stabilizing influence upon the child's life and development.

The contribution which the school organization could make towards the welfare of the community was much in the minds of those who were responsible for the London Education Service at the beginning of the century. In a prescient passage in one of his Reports in 1907, Sir Robert Blair wrote:

> The school organization can be a most valuable factor in social work after all the ordinary education requirements in the narrow sense have received attention. This is the great and unique opportunity of the Managers and Care Committees especially in the conditions of life which exist in large cities. The school may be made the focus for constructive social work having far-reaching effects. Attention to hygienic conditions, the inculcation of thrift, direction of charitable agencies, feeding and clothing, development of clubs, organization of visits to the country and to places of interest in town, attention to the lives of pupils after leaving school, the bringing of employers and children into contact and keeping in touch with children in the early days of employment, development of ideas of civic responsibility; all these can come most effectively under the control and influence of sympathetic local managers . . . . it is work that is an integral and essential part of all true education.

Again, three years later in a Report on Children's Care, he wrote:

> If one considers what is now included in the domain of education and compares it with what was included under the term as recently as seven years ago, one cannot but be struck with the change that has come over the meaning of the word. Formerly education was in the main confined to two aspects of the life of the individual child (i) the growth of character, (ii) the growth of the mind. Now education tends to look increasingly at the social problems that present themselves for solution in the case of the child. . . . The State and the local authorities have come to see that it is not enough to instil precepts and to impart knowledge but that it is also their task to see that the child is capable of assimilating the knowledge and that his environment is such that it will not entirely undo the effect of the school training. Side by side with this increasing attention that is given to social questions, there has been an increased recognition of the importance of the child as an individual organism. The teachings of biological science and psychology have laid stress on the need for treating each child as a distinct individual with capacities and idiosyncracies of its own and have shown how closely related are the physical, mental and moral aspects of child life.

And in the conclusion to his Report he refers to the unique problem that faced the Council.

> In no other town in the world [he wrote] are there so many children gathered together and in no other town are there so many physical needs to be allayed, so many ailments to be remedied or such large zones of poverty to be dealt with. . . . No one method of dealing with a problem of this magnitude can be expected of itself to be successful. The attack must be delivered from several quarters and on different lines. The school is one of the most important lines of attack and it is the recognition of the increasing importance of the school

in the social system that is one of the most striking features of the past few years.

In these passages can be discerned three persisting principles which have marked and which underlie the development of the London Education Service throughout all the changes and modifications which it has undergone during the last half-century.

In the first place, there is the belief in the school as a civilizing social influence. It is true that the school is a part of the society in which it exists, inter-penetrated and encroached upon by the requirements, the standards and the values of the world beyond its doors. Nevertheless it has a distinctive rôle in shaping the culture of the community; in improving the standards of the community, in determining the values by which it lives and by which it is sustained.

There is also a recognition of the individuality of each child; the need to treat him as such and to foster the growth of his individual personality. There has, at times during the years been a tension between the claims of the individual and those of the community in which he lives and to which he must contribute. The declared objective of Sir Percy Nunn's classic, *Education, its Data and First Principles* was 'to reassert the claim of Individuality to be regarded as the supreme educational ideal'. This stress upon individuality has latterly been modified; there has been an effort to reconcile the need to encourage individual growth with the need to have regard to the requirements of the community; an effort to develop what the Hadow Report described as 'social individuality'. The differences have been of degree, never of kind. Concern for the individual has persisted.

Finally, there is a recognition of the significance of voluntary effort and the part which it can play in co-operation with statutory organizations to ameliorate human hardship and misery and to advance human welfare. Nearly all the welfare services which the school population to-day enjoys had their origin in voluntary enterprise whether of teachers, managers, care-committee workers, socially conscious doctors or others who combined imagination with compassion, resolution with persistence. We may think of Elizabeth Burgwin, a London head teacher, and her 'penny dinners' in the 1880s, of Rachel and Margaret McMillan and their school treatment centre in London, of Mrs. Humphrey Ward and her London Play Centres Fund, and of many others. They helped to shatter what J. L. Hammond has described as the 'spirit of complacent pessimism', the resignation which regards the human miseries of this world as a divine dispensation to be endured rather than ameliorated.

There is a further point to which I would wish to draw attention since it so closely concerns much of the work for which Edmund Rich was responsible. With each successive generation that has passed through the schools the impulse towards a wider, richer life has gathered strength and momentum. The process was described in a single sentence by Elizabeth Burgwin when she gave evidence to the Cross Enquiry Commission in 1888. 'I feel most strongly', she said, 'that the girls I turn out of that school will never be content to live the same kind of life as that which their mothers have led.' The Crowther Committee have pointed to the increasing tendency throughout the last 90 years of pupils to remain at school

beyond the current period of compulsion. They remark upon two processes which have characterized English education—the extension of compulsion to round off a practice already well-established and the reflection of a higher compulsory age in an increased voluntary attendance over the age of compulsion. And together with this impulse towards a longer school life has gone a demand for wider opportunities to carry on the educational process beyond the school. It was in 1913 that Sir Robert Blair introduced his plan for the reorganization of London's system of further education. It was a composite system: one part (including the Polytechnics) controlled under schemes of the Charity Commissioners by separate and independent governing bodies and aided by the Council; the other part (mainly consisting of Evening Schools) provided and directly controlled by the Council. The reorganization aimed at bringing unity into the system and, in particular, at removing conspicuous defects in the Evening Schools. It provided for an exchange of functions between the two parts of the system and a reclassification by function. The Evening Schools were re-named Evening Institutes and reclassified as: institutes for advanced commercial education; junior commercial and technical institutes; women's institutes for domestic and health subjects and women's institutes connected with girls' trade schools; institutes of a non-vocational type for students over 18 years of age. In 1919 men's institutes and literary institutes were established as additions to the structure. This rationalization is the foundation upon which have been based, with appropriate modifications, the developments in London's further education for almost half a century, in particular, the expansion and widening scope of the women's, men's and literary institutes which have long been a distinctive feature of the London Education Service. By releasing creative energies in men and women, by enabling them to enjoy a richer social life, by encouraging them to recognize the highest when they see or hear it, whether in craftsmanship, art, music, drama, literature or the manifold activities of the mind, they have made a contribution of inestimable value towards the enrichment not only of many thousands of individual men and women, but of the community as a whole.

The men and women of 1905, Edmund Rich amongst them, were concerned with the working out of the revolutionary implications of the Education Act of 1870 and with the administrative consequences of the Act of 1902. Looking back at the magnitude and difficulties of the problems they faced and the courage and determination they applied to their solution, one must feel a sense of admiration and humility. To-day we are concerned with working out the implications of the 1944 Act, an Act as revolutionary as that of 1870. The problems are different but no less difficult, and upon their solution depends now, as it did then, the welfare and security of this country. It may well be said of those who wrought then to build a better system of education as it has been said of us to-day that 'the unparalleled growth—one could almost say eruption—of our educational system, taking place as it has whilst our way of life was itself undergoing still vaster changes, is like a mathematical problem in which new unknowns are being constantly introduced, or like a house under construction for which the specifications are ever-changing. . . . The wonder is not that our schools and colleges have

in some ways failed; on the contrary, it is that they have succeeded as they have.' If in our day and age we can strive as worthily and as faithfully as our predecessors did in theirs, we shall do well.

DISCUSSION

THE CHAIRMAN: You will want me at once to voice on your behalf our profound thanks to Mr. Houghton for a remarkable lecture. Nobody would dream of saying it is a promising subject, or in its character an interesting subject, but Mr. Houghton has presented it in a way which I personally found fascinating, and he spiced his paper up with extraordinarily pleasant and apposite quotations from his wide reading, which pleased me enormously. I was particularly pleased with the observation about the 'airy figures' of Her Majesty's Inspectors; the person who wrote that remark can never have seen the H.M.I., Mr. Hankin, known to some of you!

I have nothing to say more than to express your thanks, but I would leave this one thought with you. We are told sometimes that the enormous expenditure on education to-day is, I won't say a waste of money, but a little over-done, the Welfare State has come a little too rapidly. In 1900, I believe, the Board of Education estimates were £9 million; the other day Sir David Eccles referred to a figure of £900 million. If the expenditure has multiplied one hundred times, one does look for something of value for the money, and I think that Mr. Houghton has given us the material for an answer to any critics who presume to suggest that the increase in educational expenditure has not been justified. It is a most fascinating account of what perhaps I may say, with deference to my friend at the back, has been a silent revolution.

MR. P. K. SHAHANI: Does the lecturer feel that youth services have reached saturation point?

THE LECTURER: No. I think an enormous job can be done with an improvement and an expansion of the youth service. I think that is clearly brought out in the Albermarle Report.

MR. T. H. PINDER (Headmaster, Honeywell School, Battersea): Would the Education Officer agree that an indirect contribution to the welfare of the children has been the much closer relationship between teacher and parent that exists to-day? I am thinking in particular of the many very fine Parent-Teacher associations in London schools.

THE LECTURER: Absolutely essential. I tried to bring out my own very strong belief that the school and the home must work closely together. That can be achieved in some cases by Parent-Teacher associations, but there are other ways, of course: open days, free invitations to parents to see the teacher whenever they have a problem. There are various ways in which it can be achieved, but I personally have not the slightest doubt it is the root of successful education, this relationship between school and home.

MR. BERESFORD INGRAM: May I ask the Education Officer whether he is satisfied with the progress which has been made with nursery schools in London?

THE LECTURER: No, profoundly dissatisfied. But one is faced here with very difficult priorities both in building and, at present, even more particularly in the supply of teachers. The nursery school has for years had the lowest priority, both in building and now in teaching staff, and there are restrictions on the number of under-fives on roll at any given time.

It is perfectly easy to see why: partly because of the diversion of building resources to other parts of the educational field—primary schools and secondary schools

particularly, and further education—and partly because of the very serious teacher-supply situation.

If you ask me whether I am satisfied the answer is no, profoundly dissatisfied. There has been very little expansion; there has been a good deal of development in the sense of experiment and greater understanding of children and of child nature, but so far as the provision of additional nursery schools is concerned there has been very little development. In London, as you probably know, we have tried a number of experiments with half-time nursery school work; that is, the child goes for half a day instead of a full day. That was the cause of considerable debate and discussion before it was introduced. Some advocates of nursery schools, some experts, don't like the breaking of the child's day in that way. Others think it is perfectly reasonable. I can only say that where we have had this half-time arrangement in nursery schools we have found it has worked out quite successfully, and of course it doubles the number of children for whom you can make at least some provision.

THE CHAIRMAN: I would ask you to show your appreciation of the very fine lecture you have heard to-day.

The vote of thanks to the Lecturer was carried with acclamation and, another having been accorded to the Chairman upon the proposal of Mr. Oswald P. Milne, Chairman of Council of the Society, the meeting then ended.

THE STEEL INDUSTRY TO-DAY AND TOMORROW: A TECHNICAL REVIEW

A paper by

SIR ANDREW McCANCE, D.L., D.Sc., LL.D., F.R.S.,

Chairman and Managing Director, Colville's Ltd.,

read to the Society on Wednesday, 8th March, 1961,

with the Honble. G. C. H. Chubb, Managing Director,

Chubb & Son's Lock & Safe Co., Ltd., and a Member of

Council of the Society, in the Chair

THE CHAIRMAN: At one of our Juvenile lectures at Christmas-time I was telling the children that the reason why they had enjoyed the lecture so much was because it had been given by an expert. Tonight we are again in the happy position of having an expert with us. The shortest review that one can give of Sir Andrew's business career is to say that for over forty years he has lived the life of one who has thought of nothing else except steel, and he has had conferred upon him nearly all the honours that that industry can offer. If I may just throw off three of them: he was President of the British Iron and Steel Federation in 1957-8, Chairman of the Mechanical Engineering Research Board (which is part of the Department of Scientific and Industrial Research) from 1952 to 1958, and Chairman of the Governors, Royal College of Science and Technology, Glasgow. So that at least shows the broad sweep of his knowledge.

This is the first of two important papers on steel. Tonight we are concentrating on the technical side of the industry, and questions and observations at the end of this paper should be directed to that end.

The following paper, which was illustrated with lantern slides, was then read.

THE PAPER

During the post-war years steel production throughout the world has expanded at a very rapid rate and the United Kingdom has taken its full share of that expansion.

In 1960 Britain's steel production was 24·2 million tons. If we accept that the age of steel manufacture, as it is known to-day, began in 1864 with the successful industrial application of the inventions of Bessemer and Siemens, then it took Britain 51 years to reach its first 8 million tons of annual steel output. The second 8 million tons was reached in a further 35 years, but the last 8 million tons to bring the total to the output of to-day has taken only 10 years. From estimates of the immediate future development made after a careful study of known commitments and present trends, the next 8 million tons, it is estimated, will become a reality in only 6 years' time.

This acceleration in the rate of production is a consequence of many complex factors, but a major contribution to this rapid growth has been made by the application of scientific methods to the technology of all sections of steel manufacture.

It is the intention of this paper to review briefly some of those technical advances and to indicate also the direction from which future technological improvements can be expected to come. For this purpose the processes in the chain from raw materials to the finished steel products, which form the basis of the demand from the steel-using industries, can be simplified into three main sections—pig iron manufacture, steelmaking and rolling mill techniques—and I shall deal with them in that order.

BLAST FURNACES

Since 1950 the production of pig iron in the United Kingdom has increased by 48 per cent, but the number of blast furnaces in operation has gone down by 22, so that the average output per furnace has increased by 76 per cent. I think it will be only a matter of months before it can be said that the average output per furnace is double what it was 10 years ago.

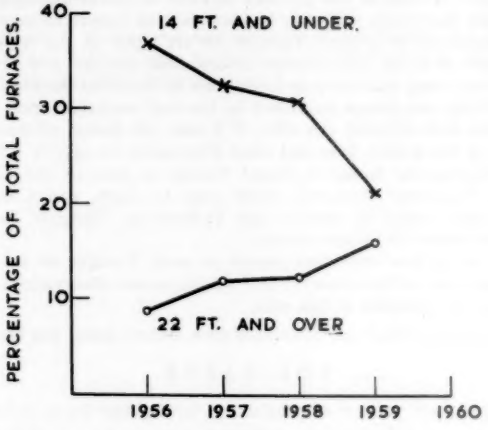


FIGURE 1. *Reduction in small blast furnaces and increase in large units during the past ten years*

There is still a wide range in the sizes of the blast furnaces in use. The size of a furnace is rated by its hearth diameter and, whilst there are still a few with a hearth diameter of less than 12 ft., their number is rapidly diminishing as they are no longer economic to operate. In the last five years three-quarters of these small furnaces have gone out of commission. This reduction and the increase in the number of large furnaces of more than 22 ft. during the same period are shown in Figure 1.

At the other end of the scale, as the hearth diameter is increased there is a limit set by a technical restriction. Inside the furnace the combustion of the coke is maintained by blowing preheated air under pressure through the furnace tuyeres and, as the furnace diameter increases, a higher pressure is necessary to make the

air penetrate to the centre. But penetration has to take place against the obstruction of lumps of unburnt coke, partly melting iron and slag mixtures, and a stage is reached at which the obstructing forces prevent sufficient air from reaching the coke at the centre of the hearth. An increase in diameter beyond this will not therefore produce a further increase in the output, since the rate at which coke can be efficiently burnt and consumed has reached its limit. It is important to bear this in mind. Whilst a blast furnace produces pig iron, it does so through its ability to burn coke. Restrict its ability to burn coke and the production of pig iron is automatically reduced in consequence. So, at the present time the growth in furnace size is temporarily halted at a limit of about 32 ft.

When furnaces of this size first came into use the output expected was around 1,500 tons per day. But the restless technical mind could not allow production to stay at that figure for long, and the pursuit of ways and means to improve outputs took another direction.

By increasing the total pressure inside the furnace, the density of the air can be made greater and a better degree of penetration obtained. So what is called the 'high-top' pressure furnace was introduced. If air is blown into the furnace at a pressure of 20 lb. per square inch and passes out at atmosphere pressure at the top, by using a large-scale safety valve at the top the discharge pressure can be raised to 10 lb. and the blowing pressure increased to 30 lb. This system has proved quite successful and a large number of high-top pressure furnaces are now in operation. By this device the output of a furnace can be improved by about 10 to 15 per cent, which is quite an important gain. This increase is obtained without any material change in the coke rate—that is, the weight of coke required to make one ton of iron.

Air blown into the furnace at the tuyere level finds its way up through the granular mixture of iron ore, coke and limestone, which forms the charge, carrying out during its passage the chemical reduction of the iron ore before leaving the furnace at the top. The rapidity of these gaseous chemical reactions is amazing. The gases have no more than 6 to 7 seconds during which to do their part of the job within the shaft of the furnace. The complete reduction of the ore of course takes a fairly long time, the passage of the ore from the top to the bottom of the furnace taking about 8 hours altogether.

By screening out all the fines before charging the ore, a freer passage is offered to the reducing gases, and this practice was becoming common during the period prior to the war. The fines were treated separately by sintering—that is, they were mixed with fine coke breeze spread on a travelling table and by burning the coke were joined together or 'sintered' into larger lumps which were then recharged into the furnace. Experience showed there was a limit to the amount of this kind of sinter that could be used in the furnace. Beyond 30 to 35 per cent the operation of the furnace tended to become irregular, and as the proportion of fines in both home and imported ores was in excess of this percentage and was tending to become even greater, the fullest advantage of sintering could not be achieved.

Scientific investigation into why this should be so showed that in the process of sintering some of the iron oxide in the ore combined with the silica to form iron

silicates which were not amenable to gaseous reduction and could only be reduced by coke in the lower and hotter parts of the furnace. If too large a proportion of the ore was left for direct reduction in this way, irregular furnace operation resulted, with a higher heat consumption which brought about in turn a higher coke rate.

It was in Sweden that the practice was first developed of adding limestone to the sinter mixture prior to sintering, and this practice has spread rapidly everywhere and is now extensively used in Britain. By combining with the silica to form calcium silicates which are the main slag-forming constituents, the iron oxide is left free so that lime serves a double purpose. In addition, when limestone is added to the furnace burden for slag-forming purposes, it only becomes chemically effective after it has been burnt to lime, an operation which absorbs heat and consumes coke. Furnace coke is expensive, so that a marked economy is obtained by using coke breeze in the sinter plant for this purpose, the present difference in price between furnace coke and coke breeze being about £8 per ton.

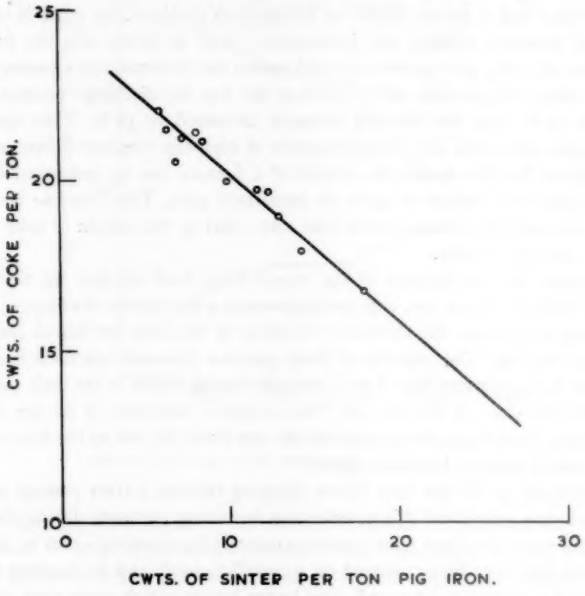


FIGURE 2. *Effect of sinter in reducing coke consumption per ton of iron*

The use of conditioned sinter—the name now given to sinter with lime additions —has led to spectacular improvements in blast furnace performance and economy. A burden consisting wholly of sinter is now possible, and its greater reducibility has led to a marked increase in outputs with a reduction in the coke rate per ton

of iron. Furnaces of the largest size which in the pre-sinter period gave 1,500 tons per day can now produce over 2,000 tons per day and the advent of the 3,000 ton per day furnace is in sight.

In Figure 2 the average coke consumption with increasing sinter burden for all furnaces in the United Kingdom is plotted from the Annual Statistics of the Iron and Steel Board and the British Iron and Steel Federation against the amount of sinter used. An increase of 10 cwt. of sinter per ton of iron has reduced the coke rate by 4·3 cwt. If a burden of 100 per cent conditioned sinter were used a further saving of 3·5 to 4·5 cwt. could possibly be realized. Sinter plants unfortunately are expensive in capital cost and it may be some time yet before the fullest overall benefit can be achieved in practice, since a large output is required to justify the expenditure.

If Britain is to maintain her competitive position our efforts to reduce coke consumption still further must continue. Since 1953 the price of coal in this country has increased by 59 per cent against an increase of only 16 per cent in the price of coal within the Common Market of the European Continent. The urge to explore the use of other fuels in the blast furnace is therefore very strong, and this is undoubtedly the direction for one line of future research.

For a different reason work on this problem has already started in America. There the urge arises from the cheapness of natural gas, and the Colorado Iron & Steel Company has reported that the injection of 1,500 cu. ft. of natural gas through the blast furnace tuyeres saves one cwt. of coke. Several companies are experimenting with the injection of coke oven gas, and already an increase in pig iron production and a decrease in the coke rate have been reported.

One other line of development which shows some promise of increasing outputs is the use of an air blast enriched with oxygen. This has been tried from time to time without showing that any overall gain could be proved; the increased hearth temperature, whilst an advantage to speedier reduction, was disadvantageous to refractory life. From the experience of two American companies, it would now appear that the advantages can be retained without the disadvantages if a regulated moisture content is added with the oxygen enrichment, and an increased output approaching 20 per cent has been achieved in this way. The Weirton Steel Company is already using 500 tons of oxygen per day in this application to pig iron manufacture.

In Britain the use of coke oven gas or a mixture of oil with oxygen-enriched air would seem to be practicable. The only drawback would appear to be the influence of the sulphur content, since both of those fuels are somewhat high in sulphur. The extent of this disadvantage can only be determined by experimental trials, but experiments on the partial substitution of oil in blast furnaces to save coking coal are in progress. The economic gain provides the incentive to make such a change a success.

On the engineering side, as the power required for blowing the air into the blast furnace went up, full advantage has been taken of the economies from higher pressures and higher steam superheat temperatures in the turbo-blowers. Even a saving of one shilling per ton on a furnace making 1,000 tons per day amounts to

a substantial sum at the end of the year. So there has been every incentive with the continually increasing price of coal to use boilers and turbines with the highest thermal efficiency.

At first glance, the use of gas turbines for blast furnace blowers seems an attractive proposal. There is available a large quantity of blast furnace gas of great purity and cleanliness, and the exhaust heat from the turbine could be transferred by means of a heat exchanger to the blowing air for the furnace, thus rendering Cowper stoves unnecessary. In this way the low thermal efficiency of the gas turbine could be corrected by the useful heat in the air blast. Whilst theoretically attractive, the present heat-resisting alloys available for constructing in the heat exchanger are not yet good enough to withstand the high temperatures required to make the thermal efficiency of such a system equal to that of the conventional methods now universal.

For the same reason the use of heat exchangers instead of Cowper stoves for preheating the air blast has made no headway, nor does it appear likely to do so in the near future.

It will not be easy for new techniques to displace the present techniques in blast furnace operation. One must remember that more than two centuries' growth has been devoted to their perfection and, as it exists at present, the blast furnace is a highly efficient machine.

STEELMAKING

Turning now to developments in steelmaking, the trend in the construction of furnaces to build them of larger and larger capacity has gone hand in hand with the construction of larger blast furnaces. There is this difference, however. Steel-melting shops are designed for the capacity of the furnaces they have to house. The installation of 100-ton capacity furnaces requires that the ladle into which the liquid steel is poured from the furnace must be capable of being lifted and moved by an overhead crane of suitable size—in this case a crane with 125 tons lifting capacity. The steel-frame building carrying the crane must also be suitably designed for its load. If it were decided that 200-ton furnaces were necessary, it can readily be seen that such a decision would necessitate the design of a complete new melting shop, since the cranes and the buildings of the first shop would be wholly inadequate for the new purpose and could not be adapted.

For this economic reason it is not a simple matter to alter the size of melting furnaces once they have been constructed, and so the number of furnaces of a given size tends to remain static. But when new melting shops require to be built, the furnaces installed are always larger than the old ones. This is brought out in Figure 3 in which changes in the numbers of 60/80-ton open hearth furnaces are compared with those of 200/250-ton capacity during the past ten years. The increase in size in the new development schemes is clearly shown.

The principal factor which determines the economics of steelmaking is the rate of production in tons per hour. Roughly this is directly proportional to the furnace capacity—other things being equal. In any single works, however, the total production must be commensurate with the market to be supplied and it is this which determines the most appropriate furnace size. In many of the older

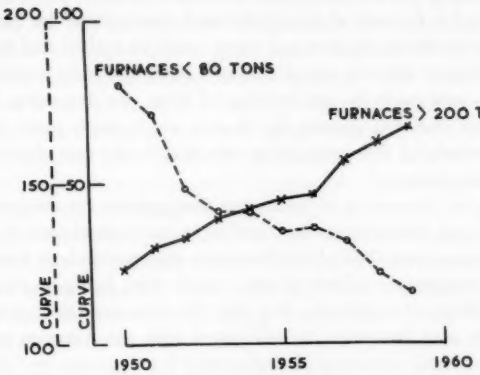


FIGURE 3. *Changes in the sizes of open hearth furnaces during the past ten years*

works financial considerations may debar complete reconstruction, but the desire to improve the output of existing furnaces is for that reason made even stronger.

Prior to the war, most open hearth furnaces in Britain operated with producer gas made from coal, but since the war there has been a substantial swing over to the use of fuel oil, including tar and creosote/pitch mixtures. The annual consumption has risen from 788,000 tons in 1950 to 2,408,000 tons in 1960. This substitution of fuels has been due mainly to the better outputs obtainable with oil fuel, although the lack of adequate development in the coal industry and the consequent shortage of supplies have also had a strong influence in bringing this change about. Increases of 40 to 50 per cent in production are being realized with marked benefit to the costs, and it seems inevitable that this trend in the use of fuel oil will continue.

The more intense flame temperatures with oil have rather a severe effect on the furnace refractories, and changes in furnace design have been necessary. Interest in the use of basic bricks—that is, bricks with a high magnesite content—has been stimulated and, although the first trials were not altogether successful, good results are now being obtained provided that a basic-lined furnace once lit is not allowed to cool down but is run continuously throughout its campaign. Close temperature control must also be maintained during the course of the charge. Under such conditions good outputs and low refractory consumption can be obtained, but even in the most favourable cases the economic gain is marginal.

By far the most outstanding change now in progress in the steelmaking world is the growing use of oxygen and the resuscitation of the Bessemer process which its use has brought about. A brief reference to the historical position will make clearer what is happening.

In 1856 Bessemer announced his discovery that by the simple process of blowing

air through molten pig iron it could be converted into steel. Almost simultaneously, Siemens developed a furnace of straightforward construction for attaining high temperatures and in which pig iron and scrap could be melted and the carbon in the mixture eliminated with the use of iron ore. Since that date practically all the world's steel has been made by one or other of those two processes. I include in the category of the Siemens process the electric arc furnace, since the chemical procedure is identical, the difference being only that in this case electricity is used to generate the heat required.

There grew up in the minds of users two designations for steel—Siemens or open hearth steel, and Bessemer steel, according to the method used in its making. Experience over many years showed that Bessemer steel, particularly basic Bessemer steel, was not so consistently reliable as open hearth steel, being much more prone to develop a condition of brittleness. For long the cause of this condition was a mystery, but it is now known to be associated with the nitrogen content, the difference in the physical properties of steel arising from an increase from ·005 per cent nitrogen to ·010 per cent being quite marked. But, while the mystery remained, people were distrustful of Bessemer steel, and steadily the proportion of the world's steel production made by the process grew smaller, and the proportion of open hearth steel increased. Nevertheless, in spite of this disadvantage, it must be recorded that the powerful development of the Continental steel industries arose from the low capital cost, the cheapness of operation and the rapidity of production of the basic Bessemer process.

Continued efforts were made to rid the process of its disadvantage, and a great deal of research work was done on the way in which steel absorbed nitrogen, when absorption took place during the operation, and how to control and minimize the actual nitrogen content in the finished product. Some success was achieved in this work, but the methods required to make low nitrogen steel were not easy to control and they never achieved general acceptance or wide application.

There the position stood until the conclusion of the war, when developments in the use of oxygen took place rapidly for three main reasons: the improvements in the technique of oxygen liquefaction making the production of large tonnages commercially possible, the increase in the demand for deep drawing sheets and flat rolled products for which a steel with a low nitrogen content was necessary, and the need to increase the production rate of steelmaking to maintain economic solvency in the face of increasing wages and other costs.

A start was made by the use of enriched air in the ordinary Bessemer converter, the normal oxygen content of 21 per cent being increased to 30 or 35 per cent, and the greater heat generated allowed more iron ore to be used to assist oxidation during the stages of phosphorus removal—this period being the most detrimental stage from the standpoint of nitrogen absorption.

The use of 100 per cent oxygen in the converter presented great difficulties. The heat was so intense that the refractories suffered much damage, and linings had a short life. Then the use of diluents other than air were tried to exclude nitrogen from the process altogether, and for this purpose carbon dioxide and steam were both economically available.

Whilst extensive trials were made in Sweden on the use of carbon dioxide, this method never has had any extended success since obviously steam is more readily available and at a cheaper cost. Oxygen-steam mixtures in a 60/40 ratio are now being used successfully and they offer advantages where a Bessemer installation already exists as well as being economically attractive owing to the great speed of production at which they operate. The actual blowing period for a 60-ton charge is about 10 minutes. The installation embodying the most advanced technology in the use of oxygen-steam mixtures is undoubtedly that recently constructed at the works of The Steel Company of Wales, producing at the present time about 12,000 tons per week, an output which is soon to be substantially increased.

However, before the difficulties in regard to the tuyeres and the refractories arising from bottom blowing with oxygen had been overcome, metallurgists were already turning to the idea of doing away with bottom blowing altogether and blowing oxygen from a tuyere inserted at the top of a converter on to the surface of the liquid pig iron held in a solid bottom vessel. The first trials on a small scale were carried out at the Linz and Donawitz Works in Austria and proved rapidly successful. The installation of a vessel holding 30 tons quickly followed, and it proved commercially successful almost at once.

The blowing time for this vessel was about 15 to 18 minutes and the tap-to-tap time about twice that, so that large outputs are obtained. The annual output to be expected from an installation of two vessels, with one operating whilst the other is undergoing relining, is approximately 10,000 times the capacity of the vessel. With a 30-ton converter, the annual output is 300,000 tons per annum and a 60-ton converter would give twice that production. In America a 65-ton installation at the Jones & Laughlin Works in Pittsburgh has produced upwards of 750,000 tons in one year, although in this case an average weight of about 80 tons was being charged. In a new installation under construction by the same company, 200-ton vessels are to be employed and a similar size of vessel is to be employed at the plant of the Broken Hill Proprietary Co. in Australia.

Both in Austria and in America the rapid development of the L-D process, as it is named, has been favoured by good quality pig iron containing only ·10/·25 per cent of phosphorus, and under the strongly oxidizing conditions of the blow phosphorus removal and carbon removal proceed together, so that by the time the carbon has been reduced to ·06/·10 per cent the phosphorus is ·020 per cent or under. With higher phosphorus contents of over 1 per cent in the pig iron the mere bulk of the slag present causes difficulties and it is necessary to carry out reduction in two stages—removing the first slag and reforming for the finishing stage. To help in overcoming this problem, experiments carried out in Belgium and France introduced powdered lime into the vessel with the oxygen blast. As the phosphorus oxidizes it unites immediately with the lime, forming a stable phosphate, and the danger of the phosphorus passing back into the steel is in this way reduced. It is not yet possible to state the full latitude which this new technique will give to the phosphorus content of the pig iron, but charges have been made on a semi-commercial scale in Belgium, and now on a commercial scale at Dillingen, making steel without slag removal from pig iron with 1·8 per cent phosphorus.

It seems clear that lime injection has come to stay as an important improvement to the oxygen-blowing technique.

Two other methods of applying oxygen, making use of rotating vessels, are also making headway—a Swedish process—the Kaldo—in which a cylindrical vessel rotates fairly rapidly on an inclined axis and a German process—the Rotor—in which the vessel, which is also cylindrical but larger, rotates slowly on a horizontal axis. In the latter method a subsidiary oxygen jet above the liquid metal surface burns the reaction gases and so contributes to the heat economy.

The growth in the production of oxygen blown steel has been rapid, and the world production is now running at about 8 million tons per annum, with new plants projected or under construction which will bring the total capacity to about 15 million tons per annum.

A large increase in the production of liquid oxygen has naturally followed. The capacity of the present steelworks plant in Britain is about 1,400 tons per day, and an expansion to 3,000 tons per day is already foreshadowed. It is not possible to separate readily the oxygen consumed in America for steelmaking from its many other applications, but new plants building there have a capacity of about 6,500 tons per day. Clearly one significant consequence of all this activity will be a marked falling away in the use of fuel oil by the steel industry, but as this amounts to only about 7 to 8 per cent of the total oil consumption, its effect on the oil industry should be relatively minor.

There is one troublesome feature which accompanies the use of oxygen. It is the production of dense brown fume, due to the intense heat of its reaction with iron, giving rise to vaporization and the production of fine particles of iron oxides. The particle size is very small, so the fume carries long distances and can create a nuisance, and for the same reason it is difficult to capture and remove. The fume extraction plant must first cool the hot gases and thereafter either wash the fume away or remove it by electric precipitation. In either case the plant is costly, and in Britain, where conformity with the Air Pollution Act makes some treatment a necessity, the additional capital expenditure adds about 25 per cent to the whole cost of the melting shop installation.

One interesting development has been the extension of continuous casting in steelmaking. The conception originated in the inventive brain of Bessemer as a method of making sheets, but the idea lay dormant until it was taken up by the aluminium industry. It was peculiarly suitable for this metal which has a low melting point, but steel has presented many difficulties to the plant designer owing to the high temperatures required. Those difficulties are now being gradually overcome largely through the development work on the process carried out by The British Iron & Steel Research Association. Several large plants are projected and should be in operation within the next two years making slabs for use in the strip mills, thus returning by a somewhat indirect route to Bessemer's original idea.

Russia has independently encouraged the construction of steelworks using continuous casting on a large scale, and several are now in operation. Where large outputs are required, however, it is difficult to see how continuous casting can compete with traditional methods. They can certainly fulfil a need for small or

medium-sized outputs and this field is the one to which they are likely to be restricted for some time to come.

No matter what process is used, all steel is made to a strict chemical analysis and the speeding up of production rates has called for a corresponding rapidity in analytical determinations. The older methods of chemical analysis are no longer quick enough, and physical methods based on spectroscopic line intensities are now everywhere coming into use. For any element the logarithm of the intensity of a characteristic line in the spectrum is proportional to the amount present for small quantities, and by a comparison of such intensities with that of a characteristic iron line by the use of photo-electric cells, an almost instantaneous estimate of the percentage composition can be made. So to-day a Quantometer analyzer can give the chemical composition of an alloy steel covering a dozen elements in a matter of two minutes or less. This instrument is suitable for elements with atomic weights greater than 30 or thereabouts. For lighter elements, vacuum operation is necessary with lenses transparent to ultraviolet light, and corresponding instruments, like the Quantovac and the Polychromator, are now greatly used. Between tapping a furnace and casting into the ingot moulds, these new rapidly operating instruments enable suitable correcting adjustments in composition to be made, provided the particular element is not already in excess.

ROLLING MILLS

There have been no really major developments in rolling mill techniques in recent years. The growth of production has meant a growth in size, in power and in the speed of rolling and an increase in the number of stands that go to make up a complete mill. But the difference in the appearance of a mill of to-day in comparison to a mill of yesterday is very impressive and the difference becomes even more impressive when the mill is in operation. One hears a great deal of talk nowadays about strip mills as the latest thing in mill equipment, but it is sobering to recall that the first strip mill, which innovated a new era in sheet production, was installed by the Armco Corporation at their Butler plant in 1926—just 35 years ago.

In rolling steel the first operation on the steel ingot takes place in the cogging mill, which breaks down the mass of 10 or 20 tons of metal to a smaller cross section and cuts it into sizes of lesser weight suitable for the finishing mills which roll it to the saleable product. Generally the whole output of the works passes through one cogging mill so that large outputs are handled. The upper limit for a straight cogging mill is about 1,500,000 tons per annum. If larger outputs have to be dealt with, the next stage converts the normal cogging mill to a universal mill in which powerful vertical rolls act in conjunction with the horizontal rolls, and the production can then be doubled to about 3,000,000 tons per annum.

Naturally the construction of such mills is very massive. The total weight of machinery and racks for a complete installation would be about 6,000 tons, whilst the mill would be driven by twin motors of 12,000/14,000 horse power, with a further horse power in ancillary equipment of about 7,000/8,000. With such large figures, it can be understood why the construction of a new steel works is an expensive affair. At to-day's level of costs, an integrated plant including coke

ovens, blast furnaces, melting shop and rolling mills for a production of one million ingot tons per annum would involve capital expenditure of about £100 million.

In the operation of rolling, the final dimension of the product is approached in stages by adjusting the height of the rolls. This height is controlled by the mill operator and with more rapid operation recourse to automatic control is taking place to a steadily increasing extent. In the first stage push-button control brings the rolls automatically to the correct adjustment. The second stage of automation—sequence control—carries through such adjustments in the correct order to correspond to whatever rolling schedule has been previously agreed. The completely automatic mill, in which every operation is carried out without the intervention of a mill operator, is fast approaching. The responsibility of the operator will then be supervisory, calling for action only in the case of a breakdown or some other unexpected interruption.

The nearest approach to completely automatic production probably exists in a modern wire rod mill. Such a mill will start with a billet four inches square in the reheating furnace. At the push of a button the billet, properly heated, is pushed out of the furnace on to a roller rack which moves it to the first stand of the mill which it enters with its own impetus. After that, the mill takes charge, reducing the cross section by stages, without manual assistance until it is small enough to enter the rod rolling part of the mill. As the cross section becomes smaller the speed of travel increases in proportion and it is highly important that the speed of each stand should be accurately adjusted to the correct ratio. A high production mill of this type will consist of anything up to 28 stands in sequence, all of which have to revolve at the proper speed ratios in relation to each other and be able to adjust themselves to any variation or slowing down due to successive billets not being perhaps at exactly the same temperature as the one that went before. To-day such adjustments are controlled by electronic devices, as it would be almost impossible to make them accurately in any other way.

Finishing speeds have increased steadily, and the latest mill whose construction has been planned in Britain is expected to finish a rod approximately $\frac{1}{4}$-in. in diameter at a speed of 6,000 ft. per minute—or almost 70 miles per hour.

During the last year or two strip mills have been very much in the public mind. There remains some confusion, however, regarding the difference between a continuous mill and a semi-continuous mill, and a plan showing both types in diagrammatic form is therefore given (Figure 4). The distinguishing difference lies in the number of stands. In a fully continuous mill these usually number ten, whereas a semi-continuous mill may have from four to six—generally the latter. The extra reduction in slab thickness takes place in a semi-continuous mill in the intermediate breakdown stand marked 'A' in Figure 4. Naturally the output from a semi-continuous mill cannot be so great as that from a fully continuous mill, but with improving techniques the outputs of both types of mill are steadily mounting and this progress will continue.

In either mill the product is the same—a continuous strip of black sheet about ·080 in. thick from 54 to 80 in. wide, depending on the length of roll, and weighing about 8 to 12 tons. Efforts to increase this weight are in course of development,

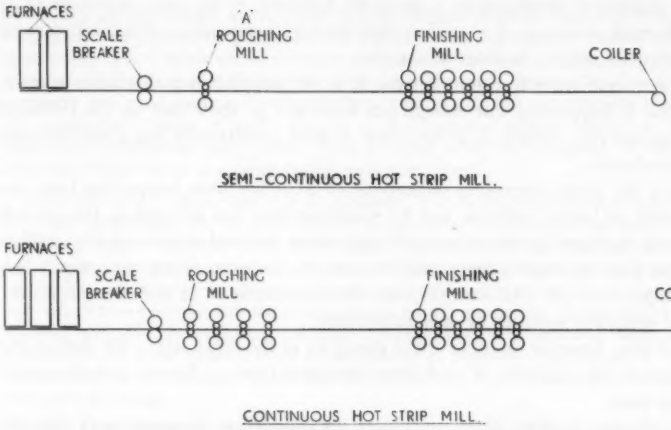


FIGURE 4. *Diagram showing semi-continuous and continuous hot strip mills*

but it is difficult to do so owing to the very high standard of quality required, which introduces metallurgical problems which are not yet overcome in casting the ingots of the large size necessary. As the strip issues from the mill, a continuous check on its gauge or thickness is maintained and made visible on dial recorders for the information of the operators. This is effected by measuring the absorption of a beam of X-rays from a source underneath the strip, which passes through the thickness to an ionization valve above, the absorption being directly proportional to the thickness of metal through which the beam has passed. The strip from the last stand is coiled and, after cooling, is transferred to the cold mill where the first operation is the removal of all scale by pickling—also carried out continuously. The cold mill consists of four or five stands in tandem, in which the strip is reduced by cold rolling to the thickness or gauge required. It is important in this operation that a sheet be produced to a close dimensional tolerance in thickness and a system of automatic gauge control, developed by The British Iron & Steel Research Association, in which the thickness is controlled by varying the tension between stands, is now everywhere coming into use. It is remarkable that with the use of such controls the variation in thickness can be maintained within a tolerance of less than plus or minus $\frac{5}{10{,}000}$ in.

Whilst the main consumers of high quality cold rolled sheets are the automobile industry and the tinplate industries, the availability of such a product has enabled many other uses for sheet to be developed, and this progress is steadily expanding. A larger and larger proportion of the total steel production of the world is going into sheets. In the United States at the present time more than 40 per cent of the steel production is in sheet form. In Britain it is about 15/16 per cent, and, as a

similar pattern of development is generally followed by the steel industries of all the industrial countries, it is evident that there still remains in this country room for further expansion in sheet production.

In the course of such a short review, it is not possible to give a fuller account of all that is happening, but enough has been said to show that on the technical side great activity prevails in all branches of steel manufacture and great advances have been made.

One of the most interesting indications of what has been happening from the application of better methods and by mechanization can be seen in the records of the men employed in the industry. In 1950, when the steel output was 16·2 million tons, the men in employment totalled 296,000. In 1960, when the output was 24·2 million tons, the total was 326,000—for an increase of 50 per cent output the number employed went up by only 10 per cent.

There was, however, another trend going on at the same time—for during the same period the numbers of staff men increased from 34,810 to 51,000—or by 46·5 per cent.

The inference is clear. More machinery for production demands more men for supervision and planning, but fewer operatives. One of the problems now facing us is to find to what extent mechanical aids to management and office supervision can bring about a saving in the manpower required. It is not an easy problem, since the steel industry presents some difficulties not found in other industries. Orders for steel products have to be aggregated and presented to the appropriate mill in the most suitable form for high production. Such aggregation demands judgement, and that unfortunately is a commodity which a computer is not yet able to supply. After passing through the mill, the aggregated total has to be unscrambled and split up again into the separate orders for each customer, so the same difficulty appears at both ends of the production line.

But I can give you this assurance, that though difficult, the hopes for a solution have by no means been abandoned.

Such developments emphasize the need for technically trained supervisors and managers to maintain and develop the scientific control of steelmaking operations now regarded as an essential service by producers and consumers alike.

In this connection, it is remarkable that educationalists in this country have for so long believed that a training in theoretical science was all that was necessary for those whose careers lay in the direction and development of technical industries. Most other countries have abandoned this view and now possess centres of independent university status devoted to technological studies of how science can be applied to the promotion of industrial progress. The experience of the steel industry and of other industries emphasizes why more facilities for training technologists at the highest level in how to apply science are so urgently required in Britain.

DISCUSSION

MR. D. J. MILLER (Air Products Ltd.): It is with great trepidation that I rise to draw Sir Andrew's attention to an omission. In the present day advances in technology that he referred to, surely some reference should have been made to the

advancing use of oxygen in the open-hearth furnace itself to enable it to compete with these new pneumatic processes? As a person who has a purely selfish reason for mentioning this, I think some reference also should have been made to the fantastic advances made in America recently when my company collaborated with a steel company and produced 72·8 tons per hour from a 200-ton open hearth by the use of oxygen-fuel lances. Clearly this is a development which could be used in expensive installations now rather than proceed with the adoption of the newer processes where there is a large capital outlay involved.

THE LECTURER: I agree that it is an omission, but in the time allowed me I had to miss out something! At the same time I agree that great advance has been made in obtaining higher outputs from the smaller furnaces through the use of oxygen. I, however, express a personal opinion: that people doing this are fighting a losing battle. The application of oxygen in a properly shaped vessel by direct means is so very much more simple and the initial capital cost is much less. In the end the direct method will win through, but naturally people who have invested large sums in existing plants want to keep them going as long as possible. That is one of the main reasons for the efforts now being made. But taking a long-term view, I think they will have to change.

MR. J. S. M. JONES: Sir Andrew mentioned that continuous casting has considerable application for small and medium scale production, but that he did not feel it was so useful for large throughputs. Could he enlarge on that a little and tell us why he feels that this will be the case?

THE LECTURER: If you are putting in a plant for, say, 250,000 tons per annum, it is going to be difficult to justify running a cogging mill for that tonnage, but with continuous casting that would be a fair tonnage. If you are putting in a plant for three-quarters of a million or a million tons, then I do not think anybody to-day would look at continuous casting, because then the cogging mill, which has a much smaller cost of conversion, would justify its capital cost.

MR. JONES: Do you think it is a temporary feature due to the present uncertainties of continuous casting?

THE LECTURER: I find it very hard to answer that question. All things start in a small way and develop, and I expect continuous casting would follow the same process. How long that development will take I have no idea.

MR. G. VIVIAN DAVIES: In planning the new Ravenscraig works, what obsolescence allowance was made and what is the life of these large steel-making plants? The oil industry, of which I have some experience, usually allows a maximum of ten years before their large units are obsolete and superseded by more modern processes. What sort of life is allowed for in planning projects costing millions? Does anyone ever make a mistake in planning of this magnitude?

THE LECTURER: I should say that the answer to the second part is, they certainly do! As for the first part of the question, the Inland Revenue allowance for obsolescence is not enough. The trouble to-day of course is that technical advances are taking place so rapidly that a plant is not worn out by the time it has got to be scrapped; that is why I answer the first part of the question by saying, whatever the obsolescence is, it is not enough to take care of technical improvements.

MR. J. HOLMES: From the point of view of the user of steel coil we have seen the tendency to make everything bigger, but it also applies to the finished product which goes to the person who converts the strip or sheet into whatever it is going to be used for. Is it not true that at some stage the steel industry must find that a lot of steel users will be embarrassed rather than helped by increasing the size of the

product they are taking? The temptation to go big must be particularly great in the case of sheet, where you just go on, as with other types of coiled material, *ad infinitum* (or to the mechanical limits of the mill coiler). It is, of course, easier for the steel-works designer to allow a suitable crane capacity in a new mill than for a number of consumer companies to modify their crane capacity.

THE LECTURER: The steel maker is only meeting a demand from the customer for the larger size of weight and product. If you take the case of an ordinary heavy bolt-making machine: at one time it was quite common for coils of 180 lb. to be used. Then it went up to 380 lb., then it went up to 600 lb., and now there is a demand for coils weighting between 10 and 12 cwt. I should think that coils weighing a ton may well be in demand very soon. The steel maker has to meet such demands.

MR. F. A. PLATTS: I wonder if Sir Andrew would care to make any comment as to whether technical progress in this country has kept pace with that in Russia? He mentioned the United States in quite a number of cases; he mentioned Russia only in connection with continuous casting. I think I am correct in saying that there has been a great deal of progress in Russia and I wonder if Sir Andrew would like to say something on our position in relation to those fields he mentioned.

THE LECTURER: I do not think that Britain need be at all ashamed of the present position so far as steel production methods are concerned. On the average, the methods in Britain are probably just as good as in any other country. In America there are some highly efficient plants with a very large production; and if you have a large production you can afford to spend more money for a given purpose than would be justified for a small production. To that extent the Americans always have an advantage. So far as Russia is concerned, I can only go by reports of missions which have been there. Their highly efficient plants (there are several of them) are very good, but there are many plants which are not quite so good. These, I understand, are rarely shown.

THE CHAIRMAN: It remains for me on your behalf to thank Sir Andrew very much not only for the way in which he must have thought out and planned this paper, but also for the way in which he dealt with this variety of technical questions. I feel very humble, as I think most of us do, in trying to relate our own business problems with the enormous ones of this industry. So we express our admiration to you, Sir, for all that you have done for the industry, and our thanks to you for your help tonight in explaining some of these problems to us.

The vote of thanks to the Lecturer was carried with acclamation, and the meeting then ended.

THE ECONOMIC DEVELOPMENT OF THE UNITED KINGDOM STEEL INDUSTRY

A paper by

SIR ROBERT SHONE, C.B.E.,

Executive Member, Iron and Steel Board, read to the Society on Wednesday, 22nd March, 1961, with the Rt. Honble. Lord Mills, K.B.E., Paymaster-General, in the Chair

THE CHAIRMAN: The steel industry, as you all know, is one of the most important basic industries, and we are fortunate that in our speaker, Sir Robert Shone, we have an engineer with great experience of the iron and steel industry dating from before the war. As Executive Member of the Iron and Steel Board, Sir Robert is charged with the supervision of the adequacy, in the national interest, of the steel industry and the adequacy of its productive capacity, and he is also charged to keep under review the price charged for certain of its products. I had the privilege of being associated with Sir Robert when I was Minister of Power and so I know we have a real authority on the subject before us.

The following paper, which was illustrated with lantern slides, was then read.

THE PAPER

INTRODUCTION

Economic development is a vast and vague subject. Perhaps I can best focus it by looking at it from the standpoint of the instructions in the Iron and Steel Act, 1953. This provided for the sale of the securities of the various steel companies held by the State and set up an Iron and Steel Board, charged with a general supervision of the iron and steel industry so as to promote 'the efficient, economic and adequate supply under competitive conditions'.

The powers given the Board to carry out its duty are essentially economic planning powers: powers, for example, of price and development control, but these have to be used in the supervision of a competitive industry.

The first economic question that arises then is whether the combination of competition and planning in steel is a satisfactory arrangement. In principle I think it is, but the test must essentially be a practical one; so after touching briefly on the issues of principle involved, I will go on to illustrate in more concrete form the practical steps taken to achieve economic development in line with the instructions laid down in the Steel Act.

PRICE CONTROL

Perhaps the issue of planning intervention is brought out most sharply in the action of the Board in establishing what it believes the competitive price should be

rather than in relying only on market forces. The reasons for this intervention are illustrated by two possible situations which might arise if the Board itself did not act.

1. It is possible to imagine a competitive price moving sensitively under the impact of changing demand conditions. This would be a price determined in a manner similar to that of the commodity markets and also possibly very like that ruling on the international steel market, where prices fluctuate violently, sometimes by as much as 50 per cent in a single year. This type of market has been generally condemned. For example, the E.C.E. reports from Geneva and the O.E.E.C. reports from Paris have welcomed policies designed to ensure as much stability as possible in steel prices. Consumers in this country have taken the same view. This attitude, in so far as it has a theoretical basis, rests largely on the belief that in the short-term the demand for steel is inelastic. Thus, on the whole, sharp upward or downward movements of prices do not lead to an early corrective change in the purchases of steel. They may tend to aggravate the stock cycle by promoting additional stocking when prices are tending upwards and further de-stocking when they are falling. For these reasons short-term price movements are not considered likely to help in evening out fluctuations in production.

A major practical objection, however, to thinking in terms of short-term sensitive price movements is the fact that production units are very large and in the United Kingdom involve only a few producers in many sections of the trade. These circumstances are wholly unlike those needed to create a sensitive commodity market, or the atomistic competition of classical economics. In practice, therefore, in the main branches of the steel industry it is unlikely that a free market price could be formed effectively in this way.

2. The other extreme is seen in the United States, where, even with strong anti-monopoly regulations, prices are administered and stabilized. They tend to follow a pattern set by a major producer acting as price leader, and have shown no significant down-turn even when the industry is operating at barely 50 per cent of capacity. An administered price of this type could well develop here if the Board itself did not use its price powers. The price adopted by American producers has been criticized for being based on securing the desired return at too low a level of operation. It has been suggested that prices are determined to give a normal return when working at between 70 to 80 per cent of capacity. This may or may not be the case, but it does illustrate the difficulty of convincing consumers and the general public that prices so determined are in fact reasonable.

THE ADMINISTERED COMPETITIVE PRICE

Largely because these two alternatives appear either unrealistic or unsatisfactory, the Board has itself set as a maximum for the home market what it regards as the long-term competitive price.

The E.C.S.C. approach on the Continent is somewhat different. There the possible dangers of at least semi-monopolistic pricing are met by elaborate non-discrimination rules so that a price charged to one customer must be extended to all. There are also reserve powers to fix maximum and minimum prices if necessary.

Both the European and British systems involve intervention aimed at securing competitive prices under circumstances in which they are unlikely to occur naturally. I am inclined to think that the opposite problem of the instability of the international market will be tackled eventually by some method which involves features drawn from the present domestic policies within the two areas. This is in line with the general approach in Gunnar Myrdal's latest work.[1]

REALISM IN COSTS

It is not sufficient, however, to be satisfied that a fair competitive price is established in the market. It is essential also that cost distortions be avoided and that competing firms feel the true impact of costs. Importance has therefore been attached to getting rid of schemes which might mask the true cost of production. Sir Alan Macdiarmid after the war took the view that the industry, and that I personally, was caught up like Laocoon in coils of such complexity that they could never be untangled.

It is significant, however, that the Industry Fund which provides the mechanism for central pooling arrangements in the industry has been reduced from some £2 a ton of steel in the early years of the Board's existence to about as many shillings at present. This is not conclusive evidence either of greater realism in costs—since pooling arrangements might well be useful in offsetting some temporary cost abnormality—or that the pooling arrangements might not in any event have been reduced without the encouragement of the Board, but it is at least consistent with a policy of securing realism in costs.

COMPETITIVE GROWTH

The United Kingdom price of steel is thus essentially an administered price, but it is set at the competitive level, and the competitive rivalry between the firms finds direct expression in their growth policies. This is no light observation, paying lip service to competition. Over the past decade steel output has increased by 50 per cent, but among the ten largest firms the growth has ranged widely from 1 per cent to 500 per cent. And among the smaller firms and plants there have been many that have gone out of production altogether, others that have doubled their output.

In development just as in prices, conditions of large-scale production make the assumptions of atomistic competition entirely unrealistic. The competition is real but the traditional market disciplines of trial and error do not alone always lend themselves to solutions when hundreds of millions of pounds are at stake at one time.

To take an example, in 1957 the Board was encouraging strip mill development. There was hesitation in the industry. Yet later on, once one firm was ready to embark on a new mill, it was not long before there were proposals from three firms. Each proposition was of great merit in itself, but there was not room in the market—or in the plant-maker's works, if they were also to give adequate attention to exports—for three major new sheet works at one time. The Board here had to use its influence to ensure that only two of the schemes went ahead, at Newport and in Scotland. This decision settled a competitive issue in a public and impartial way

and on economic criteria, in a manner that supports rather than weakens the competitive working of the industry as a whole.

The competitive growth of companies does not mean that there is not an important place for co-operative action among them: for example, in the fields of research and of training, and in the collective purchases of some materials, as well as in many other ways. These co-operative services in the case of steel are highly developed, primarily through the British Iron and Steel Federation.

DEVELOPMENT

There is the feeling that in determining the general scale of development of the industry, enough steel should be provided to support some stepping up of the rate of growth of the British economy. The higher proportion of the national income devoted to investment in the past three years—17 per cent compared with 14 per cent in the earlier post-war years—provides a basis for believing that a higher rate of growth is possible in the future. And there is little doubt that adequate steel will be available to support this growth. Evidence of the improving supply position is seen in the substantial current surplus of steel exports over imports. Last year the export surplus was nearly double the tonnage achieved in 1955, the previous period of heavy home demand and stockbuilding. It was nearly four times as high as before the war, and should rise further again this year.

Other evidence of improving supply is seen in the number of major new steelworks on which construction has started since the war and particularly in the last few years. There will be completely new plants built in all the main steelmaking areas; in Scotland, the Midlands, South Wales and on the North-East Coast. And all these plants can be rapidly expanded further on the basis of the new techniques described by Sir Andrew McCance.

You must forgive me therefore if I do not enter into any discussion of how we can get the extra capacity needed. This presents little physical problem. The problem rather is whether the national economy will indeed grow more rapidly, and can the cost of steel in this country be kept low enough to help this growth and at the same time expand the market for steel. This leads me to pass from general comments on the balance between competition and planning in steel to a more specific consideration of steel prices. Ultimately it is their movement in relation to prices generally which will determine the success or failure of the industry.

PRICE MOVEMENTS

The facts of price movement since the war are shown in the graph (Figure 1). It will be seen that steel prices have risen by more than retail prices. There has been a large rise in the prices of steelworks plant and also a still larger percentage increase in coal prices. The prices of the other main raw materials, imported ore and scrap (as shown by the figures at the foot of the graph), have risen by a little more than steel prices. Hourly earnings of employees have gone up in line with those of the country generally and cannot therefore be considered a special problem in relation to the steel industry.

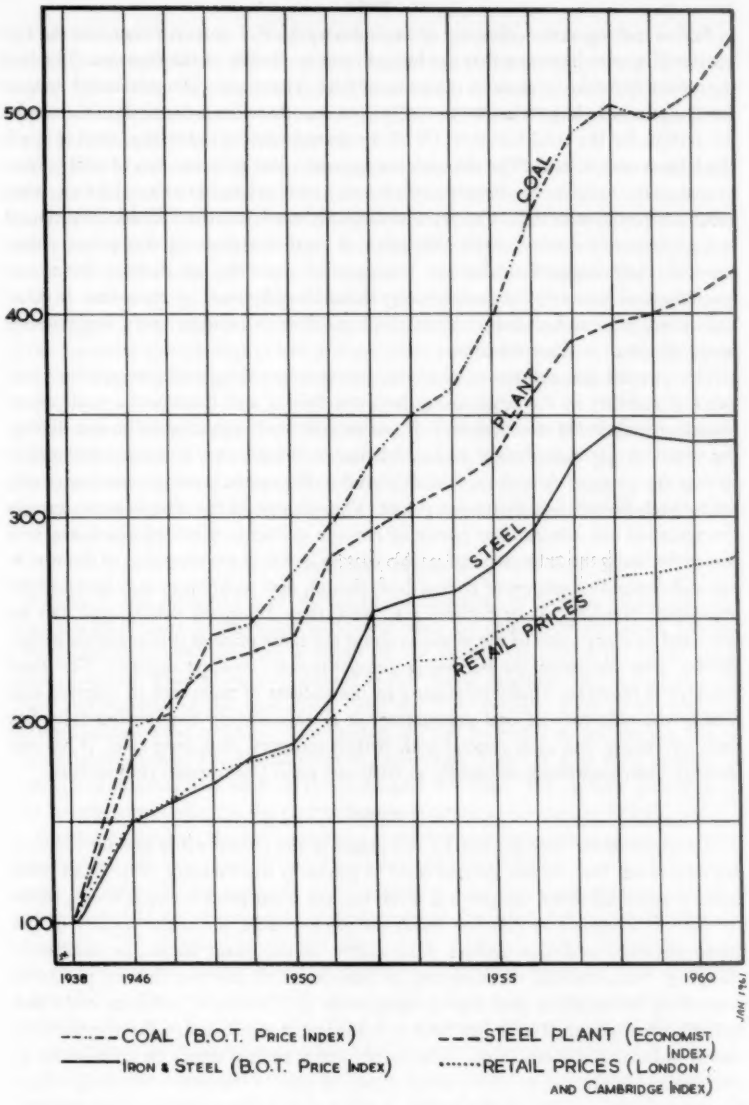


FIGURE 1. *Movement of steel prices and main cost elements: yearly averages*

COAL

Before looking at the efficiency of the industry itself, I must comment on the two outstanding cost increases that are brought out so vividly in the diagram. The first is an over five-fold increase in the price of coal. There are well understood reasons for the relatively large increase in coal prices, but there is no doubt that the results are serious for the steel industry. Of all the manufacturing industries, steel is much the largest user of coal. The dependence on coal—just over one ton of coal is used to make one ton of steel—largely explains why steel prices have risen by more than most competing materials. The price of timber is much less than double, aluminium and glass barely double, while the price of steel is almost $3\frac{1}{2}$ times that ruling pre-war. Any suggestion that on 'commercial grounds', as distinct from cost grounds, coal prices to the steel industry should be advanced by more than to other industries, promotes a strong reaction and an effort to avoid in every way possible being exposed to discrimination.

The increase last autumn of nearly 10 per cent in coking coal prices, after some years of stability in the relationship between British and Continental coal prices, caused anxiety in the steel industry. It was feared that it might be a sign of a diverging trend. A gap has already widened between British and American coal prices so that the price of American coal delivered to European ports is now frequently below both British and European prices. This change in the situation has greatly strengthened the competitive power of nations overseas, many of which are well placed for using the extensive and widely distributed iron ore resources of the world, but still depend on import of coking coal, though new techniques may increase the possibility of using oil or natural gas. Now that American coking coal can be delivered to many parts of the world at about the same price as it is available within Britain, new countries are becoming competitors in steel production. The steel industry is therefore vitally interested in the success of measures to increase still further the efficiency of coal production. It is encouraging that productivity has been advancing, but as is general with British industry, including steel, it has not recently been improving as rapidly as with our main Continental competitors.

PLANT

The other factor brought out by the graph is the considerably greater increase in plant prices than in the general level of prices in this country. The retail price index is about $2\frac{3}{4}$ times the pre-war level, but the plant price index is over 4 times pre-war. It is unsafe to rely too much on price indices, since the quality of the goods covered, and this applies particularly to the plant index, is constantly changing. Nevertheless, the disparity in movement in the two indices points to a handicap in installing new capital equipment as a means of reducing costs and saving scarce labour. There has been a tendency in this country for the publicly owned industries to keep down their prices when selling direct to consumers as compared with the prices of the same products sold to industry. Anything which increases prices to industry to enable direct purchases by consumers to be kept artificially low, tends to increase the cost of capital equipment as compared with labour and could have an adverse effect on productivity growth.[2]

COSTS AT NEW PLANT

The two cost items so far referred to relate to matters outside the industry. I now turn to costs more directly under the control of the industry itself. The best way of illustrating the significance of these items is I think to describe briefly the way in which maximum prices for steel are determined and to bring out some of the main cost components in such prices.

The Board in determining maximum prices has departed from the war and early post-war systems of control, which were based essentially on average costs, to one based in the main on costs attainable by a new plant. Other factors may be taken into account, but primarily the object is to establish a price that reflects 'the costs of production and reasonable capital charges at new plant, incorporating the most modern techniques, favourably situated for raw materials and markets, and operating at a high degree of efficiency'.[3] This approach is based on the view that the competitive price is that at which it would be economic to invest in the industry, and that competitive forces would prevent the price rising significantly above this level.

The second diagram (Figure 2) gives some indication in the column marked N.P. of the costs at the new plant and the price arrived at. A careful technical assessment is made of the scale, techniques and costs at such a plant. To the operating costs is added a margin for profit and depreciation on the capital the new plant requires.

THE RANGE OF COSTS

Figure 2 also indicates how the costs and margins at existing plants broadly compare with those of the plant used as a basis for price determination. For the sake of simplicity the diagram is based on the figures for one of the main heavy steel products. Production is confined to hot metal practice, i.e., it includes the costs and margin on the operations from the blast furnace stage to the disposal of the finished steel product. The figures are not intended to be precise, but to illustrate reasonably the broad position prevailing over the first nine months of 1960 so as to bring out some of the principles involved. The figures quoted must not be taken as relating to the cost and price position as it exists in March, 1961.

It will be seen that the best operating costs achieved are almost as good as those assessed for the new plant. This of course would be expected as there has been a major creation of new capacity in the industry and the most modern plants in existence would not be expected to deviate much from the standard used for price purposes. The ghosts of many past plants, now scrapped, can be imagined on the left of the diagram with figures for operating costs that would be well above the price line. In the same way future plants embodying new techniques should come in during the next five years, and could be estimated and included on the right of the diagram. One such estimation for a future plant is shown marked F.P.

To bring out the factors determining the building of new plant to replace old the same cost figures are set out in Table I. This analyses in approximate terms the contrast between the cost elements at (i) a new plant used for price determination, (ii) an average existing plant, and (iii) a high cost plant. At one end of

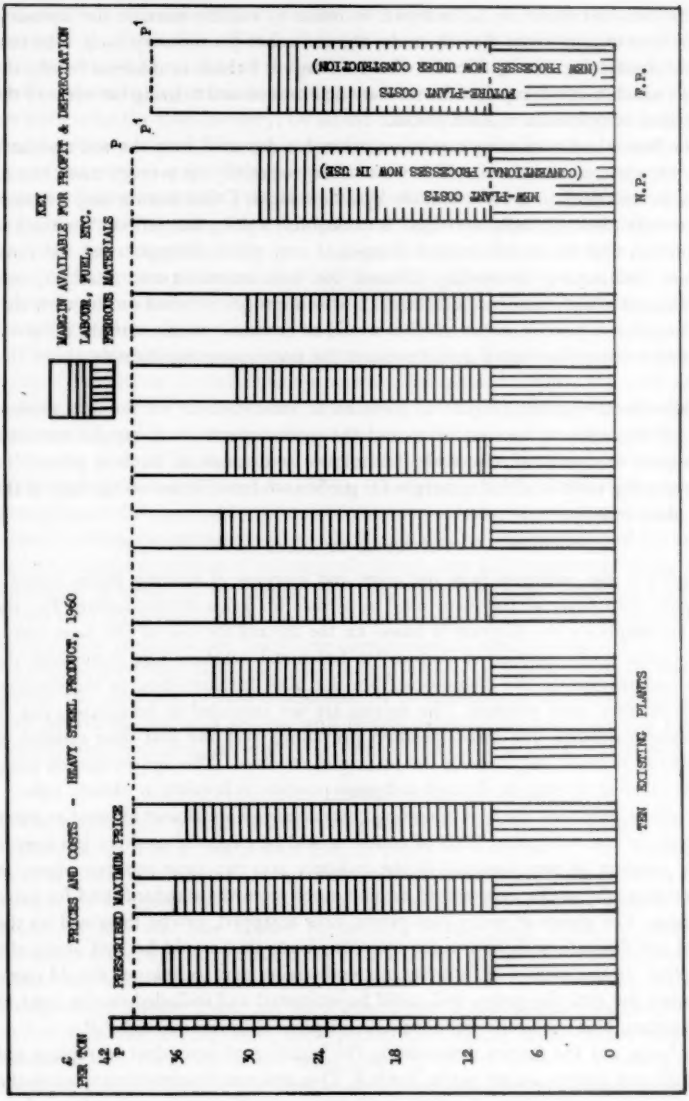


FIGURE 2. *Prices and costs, heavy steel product, 1960*

the scale some of the plants are earning little over £2 10*s*. per ton towards capital charges compared with £10 15*s*. assessed as necessary at the new plant and compared with £6 12*s*. as the average current gross earnings.

TABLE I

COSTS SUMMARY

(per ton of product)

	High Cost Plant	*Average Plant*	*New Plant*
	£ *s.*	£ *s.*	£ *s.*
Wages and salaries	8 14	6 13	4 2
Coal, fuel and power	9	7 11	6 8
Inland transport	3	2 17	2 15
Metallic raw materials ...	10 10	10 10	10 10
Other costs	6 3	5 17	5 10
	37 7	33 8	29 5
Depreciation, tax and profit ...	2 13	6 12	10 15
Realized price	40 –	40 –	40 –

UNECONOMIC PLANT

The minimum margin of £2 13*s*., shown in the Table, is very close to the point at which plant becomes uneconomic. The extractable capital from a steel plant might consist of something like £12 per ton for working capital including stores, or perhaps a total of £20 per ton of production when the residual value of the plant is included. Unless, therefore, a margin of about £2 a ton is secured, it would be better to transfer the extractable assets to some other line of investment; though this may not be such a straightforward issue when account is taken of the many human and other factors involved. Sometimes, too, it may be possible to modernize favourably part of the plant so that the whole continues to be viable. In this instance it does not look as though any of the plants concerned are yet quite at the point of replacement.

But in considering replacement we must look ahead for, say five years. By then it may be expected that wages will rise in relation to prices by some 15 per cent—on the doubling the standard of living in 25 years theory. In this event the plants at the back end of the scale are likely to be faced with wage costs that are about £1 6*s*. a ton higher in relation to prices, and must be considered on this account alone as having crossed the border-line between being able to compete effectively with modern plant and being uneconomic and obsolete.

Another way of expressing the impact of future development is to compare the costs at future plant (F.P.) with existing plants, on the basis of a continuation of present costs of wages, fuel, etc. In that event prices would be likely to fall to the future plant level, and again the last two plants at least on the diagram would not be making a reasonable return on their transferable capital and would become uneconomic.

PRODUCTIVITY INCREASES

The particular illustration throws doubt on the *commercial* attractiveness, in this case, of proceeding any faster in major replacement of old by new plants than has already occurred and is likely to go on occurring. Nevertheless there would be considerable national advantage in encouraging a more rapid movement from the left-hand position on the graph to the right-hand. These are:

(*a*) The new plant makes much better use of the country's scarcest resource, namely its labour force. Less than half as much labour per ton of steel is required as in the old plant. This figure is slightly reduced if allowance is made for the labour content of the depreciation element at the new plant.

(*b*) There are substantial energy savings of up to 30 per cent at the new plant. The energy content is made up in the main of labour employed in collieries and elsewhere, so that the saving here again involves a release of labour for the general expansion of the economy.

It is a well-established fact that productivity advances in Britain are more sluggish than in most other advanced countries. Productivity growth in steel has been a little over 3 per cent per annum compared with just over 2 per cent for the United Kingdom economy as a whole. But both these figures are well below the corresponding growth rates in Western Europe. Concern is not so much with the absolute level of efficiency, or with the comparative level of steel prices, which are not dissimilar, but with the faster pace of productivity advance in competing countries and with the possible implications for the years ahead.

What can be done about this situation? Two lines of approach, one internally through the industry, and the other relating to general national policies, will be referred to.

OPERATIONAL EFFICIENCY

So far as internal possibilities are concerned, these consist in part of measures to increase efficiency in general operations. These measures are frequently just as valuable for old as for new plant, and in some cases there is even more possibility of improvement than at newly installed plant. There is thus a prospect of productivity increases quite apart from that secured by the replacement of older equipment with newer and more efficient plant.

In general, however, it would seem that in the steel industry. and this is probably true of many other highly capitalized mass production industries, the possibilities of greater efficiency in a given plant are less striking than those obtained by replacement of plant. A preliminary study suggests that firms that have replaced only a minor part of their plant over the past fifteen years have increased their productivity by about 1 per cent a year, or only a third as fast as the industry generally,

and much less than a third as fast as the firms that have substantially replaced old by new equipment. Nevertheless there may be considerable scope for greater efficiency apart from modernization, for instance by speeding up plant repairs and improving plant utilization, and by some modern management techniques such as operational research. Further, co-operation by management and unions in many directions may well give valuable results.

PLANT EFFICIENCY

It should also be possible by research and development work to find new types of capital equipment capable of giving a still greater economy in operating cost at the pace-setting new plants. Perhaps even more important than that these plants should have lower operating costs, is that they should give a greater output from a given capital expenditure. There are fortunately many examples of current development along these lines in the steel industry, for instance the use of high top pressure and oil, coal and oxygen injection into blast furnaces and converters; adoption of continuous casting; and the installation of more powerful rolling mills with automatic controls. However, I will not vie with Sir Andrew McCance in describing these varied developments. In some measure they are embodied in the column shown in the diagram for future plant costs which illustrates possibilities opening up some three to five years ahead. Any policy for increasing productivity must give intensive attention to these future possibilities. It is a difficult but important function of the Board to try and help in ensuring that the firms, and the industry through its central research and other activities, are continuing in every way possible to make this effort.

INTERNATIONAL COMPARISONS

The other main line of approach to faster productivity growth is to consider whether the external factors bearing on industry could or should be adjusted in any way to encourage the more rapid movement from one end of the productivity scale to the other. The possibilities here relate in the main to arrangements which might change the *true* balance of costs as seen by a manufacturer in the direction of reducing those peculiar to modern plant while increasing those at old plant. A comparison with the situation in competing countries is useful here.

An obvious initial approach might be to think that if wages were more rapidly advanced, this would speed up the change from more labour-intensive to less labour-intensive methods of production. This, however, would not necessarily occur, since the higher labour cost, while undoubtedly putting up costs at old plant, will also, and almost proportionately, increase the costs of the new capital equipment which ultimately is predominantly made up of labour cost. A wage increase, however appropriate on other grounds, will therefore not in itself necessarily alter the balance of cost between the use of old plant and the installation of new.

I would emphasize that policies designed to speed up productivity increases must be ones which differentially affect old and new plant, or less and more efficient production. Some of the possibilities are listed under the three subsequent headings.

INTEREST RATES

A major debit against new plant is related to the rate of interest. One per cent more in interest charges would represent an addition of approaching £1 per ton to the costs of steel produced at a new plant. If this occurs, it would pay to keep in operation an old plant with a labour cost considerably higher than at present. Broadly, it would then pay to retain old plant with a productivity up to some 10 per cent worse than plant which would at present be replaced. Conversely, a reduction in the rate of interest would speed up the rate of replacement of low productivity old plant by new plant.

Quite apart from the general rate of interest, each firm can affect the basis on which it can borrow by the conduct of its affairs. One of the severest disciplines in a competitive industry arises from the need to finance expansion in good part from the capital market. It is largely this discipline which enables a public supervisory Board to confine its work, as the Iron and Steel Act intends, to a general supervision of policies and not to check on detailed operations or expenditure.

TABLE II

COMPARISON OF CAPITAL EARNINGS OF STEEL COMPANIES
(average 1955–59)

	U.K.	W. EUROPE
	15 Companies	*52 Companies*
	per ingot ton	*per ingot ton*
Disposal of gross earnings:	*s.*	*s.*
Depreciation (as written off by Companies)	34	77
Retained profits (including allocation to fixed asset reserves)	53	18
Total retained in business	87	95
Gross dividends and interest (before income tax)	36	30
	123	125
Taxation (other than income tax on dividends and interest, and turnover and employment taxes)	44	28
	167	153

TAXES ON CAPITAL EARNINGS

The figures relating to capital charges in Table II were extracted from published accounts covering the bulk of steel output in the United Kingdom and Western Europe. They are illustrative of the position, but comparison is difficult and they can only be regarded as giving a broad indication.

The total earnings for retention in the business and for distribution to investors are surprisingly similar in the two cases. The treatment of depreciation is very different in the accounts and, to some extent, this reflects a real difference. The gross profits distributed are rather higher in the United Kingdom. This is related to a higher investment per ton of capacity, itself arising partly from the different depreciation treatment. Also, the gross profits distributed are subject to higher taxes in the hands of recipients in the United Kingdom than on the Continent, and net profits are likely to be very similar. The striking difference in the figures is the lower tax on the capital earnings of the companies on the Continent. This is lower by 16*s.* a ton of ingots, or by over £1 per ton of finished steel.

SOCIAL SECURITY COSTS

Employers on the Continent, as a converse to lower taxes on earnings created by investment, pay higher taxes in proportion to the labour employed than in the United Kingdom. The following Table shows the make-up of the wage cost element in the steel industry on the Continent and in this country.

TABLE III

TOTAL LABOUR COST PER HOUR IN THE UNITED KINGDOM AND E.C.S.C. STEEL INDUSTRIES

(March-April, 1959)

	Amount paid as Wages	*Amount paid in Social Charges by Employers*	*Total Labour Cost*
	s. d.	*s. d.*	*s. d.*
United Kingdom ...	6 6	4	6 10
E.C.S.C.	6	1 8	7 8
France	5 5	1 11	7 4
Germany	6 5	1 4	7 10

It is notable how similar are the wages per hour in the two areas. But again the tax treatment is very different.

Taking the taxes a firm pays on its employment costs and capital earnings together, it would seem that the aggregate burden is roughly similar, in the case of

steel, in the two areas. But as between employment and capital taxes the incidence is very different. The Continental system bears much more lightly on the capital-intensive high-productivity firm, while the United Kingdom system bears more heavily on such a firm but more lightly on the low-productivity firm with little remaining capital. A rebalancing of the taxes falling on companies in the Continental direction might be one of the measures which could help towards faster productivity growth.

CONCLUSION

The problem of the '60s is that of efficiency and cost reduction. This involves a speeding up of productivity growth in the steel industry and indeed in the economy as a whole. There are great potentialities here. If realized, they will help in raising living standards and in strengthening our overseas balance.

I have given examples of the working of the distinctive combination of competition with planning in the steel industry. The synthesis is I believe of value in itself. It is also an experiment of significance in the developing relationships between large-scale industry and the public interest.

Finally, quite apart from these economic issues, the future of the industry depends above all else on individuals: on their seeking out new ideas, grasping them and trying with imagination yet care to put them into operation. The steel industry is showing an increasing readiness to look frankly at its weaknesses as well as to be exhilarated by its achievements, and I am confident that it will continue to make a great contribution to the progress of this country.

REFERENCES

1. Gunnar Myrdal, *Beyond the Welfare State*. Duckworth, 1960.
2. Sir Robert Shone & R. Fisher, *Industrial Production and Steel Consumption*, Part VI, *The Expanding Economy*. Royal Statistical Society, 1938.
3. Iron and Steel Board Annual Report, 1958.
4. P.E.P. *Promotion of Economic Growth*, March, 1961.

DISCUSSION

MR. A. G. MACPHERSON: May I refer to Figure 2 in Sir Robert's paper? In the breakdown of the costs of future plant there is a lower element of cost allocated to the capital element, due to the reasons he explained. In effect the capital profit to be allowed is being lowered by technological improvements being introduced in the industry. This brings up the problem of whether the account's depreciation is the true element of capital cost, or the real element of capital cost is brought about by obsolescence. In effect, the improvements being introduced by the industry are penalizing the capital element, and the benefit is not necessarily passed to the capital, but passed to the customer. In calculating costs for future prices, is the accounting depreciation assured to be the cost of capital, or is an allowance made for obsolescence, that is, for the running down of capital value being much faster than the accountant would have one believe?

THE LECTURER: For pricing purposes a twenty-five year life depreciation is used, that is four per cent per annum straight line. This is a much shorter life than the physical wearing out. With good maintenance, plants last almost indefinitely. There are many old plants in the industry which have done double this service, so that twenty-five years does allow something for obsolescence.

I should have expected this four per cent to be the subject of greater controversy than it has been, but in point of fact it is a thing on which accountants and the industry and the Board have been reasonably well agreed. When the Board was first appointed, we started with a thirty-three year life, then reduced it to twenty-five years to give greater weight to the point you have in mind. If, of course, it was shortened too much, if obsolescence came along so rapidly that we had to put up the depreciation rate, we might have prices so high that no one would buy the steel, and we should be in a vicious circle. Fortunately the figure adopted seems to be reasonably adequate. It is on a replacement cost basis so that firms get the benefit of the four per cent in terms of current real values.

SIR DENNIS PROCTOR, K.C.B. (Ministry of Power): I should like to raise a point on the same part of the diagram to which the previous questioner referred. I should like to ask Sir Robert if he could explain a little further why it is that he thinks that the capital elements in the cost per ton of the future plant will come out at a lower proportion than in the new plants as they are now? The explanation he gave was that there will be a greater output per unit of installed capacity, but nevertheless it seems very surprising. One would expect that a more developed technical plant would show a larger proportion of capital and a smaller proportion of labour and operation costs, and indeed that is the trend exhibited by all these other charts. Going across the page from left to right, each of them shows an increasing proportion of capital charges within the cost per ton, and it seems surprising on the face of it that the trend is expected to be reversed at the next stage in the future.

THE LECTURER: There are two parts I think I must answer. On the last point, as to why the amount for capital showed a declining trend—this of course is because the capital is progressively written off. When these were new plants they may have had a very high capital element, but as they get older, the residual capital gets smaller.

The main substance of your question is why we allow substantially less for capital at the future plant than at the new plant. In this case both plants are new plants in their early years, the future plant being our estimation of what would be the costs at a plant now being designed. At such a plant we do show a bigger saving in capital charges than in operating costs. This is primarily because the future plant—and it is based on a concrete example of a plant worked out by experts—is assumed to use the L.D. process, and the L.D. process, that is the oxygen converter process, shows a big saving in capital as compared with the open hearth process. The new plant at present used for price fixing purposes is the open hearth. We have not thought that we should be justified yet in taking the L.D. plant as the model for price-fixing purposes. The possibilities are known, but at the present time it would be unfair to regard that as being in full blast and setting the competitive pace. Future plants will also have very high output potentials, but in the main the lower future capital cost relates to an actual technical change due to a specific type of plant requiring less capital.

MR. J. S. M. JONES: Last year the prices for plate and sections were reduced, and one of the main reasons given was that iron-making costs had been lowered. Can you say why this reduction was not extended to all steel products?

THE LECTURER: I do not think it was attributed to iron-making costs; a reduction here would have affected all products. The prices of heavy sections and plates were reduced as a result of larger outputs at new plants making these products. A good example was the coming into operation of a new steel plant and beam mill at Dorman Longs.

The reduction in heavy steel products parallels the reductions in the strip mill sheet prices when the new strip mills came in six years ago. Substantially lower prices

were set for strip mill sheets and tinplate than had been the case for the old hand mill sheets and tinplate.

SIR CHARLES GOODEVE, F.R.S. (British Iron and Steel Research Association): Sir Robert based much of his paper on the desirability of improving labour productivity in the country, and he rather took it for granted (probably quite rightly) that the audience would be completely with him on that point. However, in a large part of the industry in this country the word productivity is still rather a 'naughty' word, and that is partly because some companies have situations which they are not very anxious to disclose. I assume that that does not really apply to the steel industry in any way, but I should like to ask Sir Robert whether the importance of productivity is in his view fully accepted?

Sir Robert referred to the interest rate, which, if it went up one per cent or down one per cent, had an enormous effect on productivity. The man in the street rather thinks that the interest rate is what the Bank of England, with the permission of the Treasury, decides it shall be, but is it quite like that? Is it not partly dependent on supply and demand for capital, and do not the Bank of England and the Treasury mainly follow what Nature or our social system would insist on them doing? Could we really blame the Government for our high interest rates and therefore our low productivities?

THE LECTURER: I might well have discussed productivity in other senses than labour productivity. I know that Sir Charles Goodeve has done a great deal of work in emphasizing the importance of plant productivity, getting bigger outputs from the given plant but cutting down charging and waiting times, etc. I did refer in passing to the further possibilities of progress in these directions, but above all else I think productivity in the sense of output per man is the crucial factor for this country. We have a limited labour force; it is not growing rapidly, less than half per cent per annum. The only way in which the country's total output can in fact grow is by an increased output per man. So I would regard the increased output per man as absolutely crucial, even in any one industry like steel. In the end the two great elements in cost are labour cost (and this can only be reduced by greater output per man) and interest, because we have got to store up labour in capital equipment and you have got to pay interest on this.

So I come to Sir Charles's second point about the rate of interest. This I know is a very controversial point, and I pointed out the significance of the rate of interest in capital intensive industries like steel. In an undertaking like atomic energy, of course, it is even more crucial; it makes all the difference as to whether, at the present time, atomic stations as compared with coal are viable or not. Some economists hold the view that the interest rate is naturally determined and nobody can do anything about it. I would not take that view. I would say that Government and other policies do influence it. I am not advocating too low a rate of interest, I am just emphasizing the importance of the rate of interest in connection with steel development. There may be other considerations greater than this which would necessitate a high rate of interest; but I believe that policies can affect it up and down and a low rate is favourable to productivity. For example, one of the reasons America has a higher productivity is because for many years now they have had a considerably lower long-term rate of interest than in this country.

SIR CHARLES GOODEVE: Could I put a supplementary point? I asked the two questions because together I believe they are very closely linked. Some economists also think we cannot get interest rates down until we get a reservoir of men who could be employed in capital investment. As long as there is a shortage of men the interest rate must be high, and therefore we are in a vicious circle from which we can only escape when we get a few men released to build for higher productivity.

THE LECTURER: Much of my lecture has been concerned with this very point of releasing men from inefficient production so as to permit greater future expansion.

MR. KENNETH MARSHALL (Director, Joint Iron Council): I wonder if Sir Robert would tell us something about the high expectation of life of high-cost plants. It occurs to me that in this admirable exercise he has given, the fact is that the process of transferring from the middle or average plant to a high cost plant is going to take quite a number of years, whether by deferred maintenance or by sheer optimism, so that the calculations of the Board can be completely upset as to whether its estimates for demand are going to be right for the new plant.

THE LECTURER: Of course one of the important reasons for carrying out this exercise and studying the contrast in cost between the old and the new plant has been to try and estimate how much plant will in fact go out in the next five years. In formulating the present development plan it is not sufficient to say that we are now producing 24 million tons of steel, we shall need 30 million tons, and therefore another 6 million tons of capacity must be created in the next five years. We must add to that the amount required for the obsolete plant, which may well be another 4 to 5 million tons. Therefore it is very important to find cost ways of determining how much plant is likely to be obsolete as well as using expert technical opinion about the plant. The Steel Board, in their last development report, were rash enough to set down their estimate of the percentage of capacity, product by product, which was likely to be uneconomic during the next five year period. Mr. Marshall is right in thinking that the best estimate is likely to be wrong—but that is no reason for not trying to make the best estimates possible.

MR. F. P. DYSON, M.I.C.E. (Woodall-Duckham Construction Co. Ltd.): Sir Robert has drawn attention to the rather alarming increase in the cost of plant as compared with the cost of steel production, and it is significant when you look at the graph shown at Figure 1. Turning to Table I, where it is seen that wages and salaries in steel production have been reduced from about 20 per cent to about 10 per cent—in other words from £8 14s to £4 2s—I would suggest to Sir Robert that it would be impossible for the plant manufacturer to reduce his wages and salaries in such a proportion, even though he may have been able to improve his performance by mechanization to some extent.

THE LECTURER: I can only say that the figures for labour cost at old and new plant are based closely on cost at actual plants. Remember that the age gap in plants is some 25 years, and halving the labour cost over such a period has a relationship to doubling the standard of living in 25 years.

MR. I. W. FAY: Sir Robert mentioned the point that we have recently changed over to pricing steel on new plant costs. Is there a possibility that with a sharp breakthrough in technological development, prices based on a reasonable return on any resulting new plant would not give a reasonable return on the capital employed in the industry as a whole—would not other considerations have to be borne in mind?

THE LECTURER: Yes, I think that puts a finger on one problem this policy poses. It might be over-fierce in a period of rapid technical change. If you immediately change prices downwards with every new development, it might be excessively alarming to people using existing plant, who have done their best in the light of technical knowledge at the time they were built. So I have been careful to say here that new plant costing is the major consideration, but that it must always be interpreted in the light of other considerations. For example, an important factor is the movement of prices overseas. If we have an invention ahead of the field there is no need to cut competitively over-fast. So I quite agree that you would have to

apply this policy with care and watch that its impact on existing plant is not unduly harsh.

On the other hand, if there is an invention or a technical change that makes the past obsolete, you cannot ignore it and let everyone secure the profits they might have otherwise expected to get if it hadn't occurred. Rapid progress has to be reflected in prices. An unexpected new car model unfortunately does make last year's model less attractive than you hoped it would be.

THE CHAIRMAN: We have had a most interesting and useful discussion, and it only remains for me on behalf of us all to congratulate Sir Robert Shone on his address and to thank him for the very full, diplomatic and skilful way in which he answered the questions. He did not budge from the question of who is responsible for the high cost of money, and I was very interested to hear his reply.

The vote of thanks to the Lecturer was carried with acclamation and, another having been accorded to the Chairman upon the proposal of Mr. Oswald P. Milne, Chairman of Council of the Society, the meeting then ended.

RABINDRANATH TAGORE

The Sir George Birdwood Memorial Lecture by

GEORGE E. GORDON CATLIN, M.A., Ph.D., F.R.S.L.,

delivered to a joint meeting of the Society's Commonwealth Section with the Royal India, Pakistan and Ceylon Society, the East India Association and the Royal Commonwealth Society on Tuesday, 9th May, 1961, with His Grace the Duke of Devonshire, M.C., Joint Parliamentary Under-Secretary of State, Commonwealth Relations Office, in the Chair

THE CHAIRMAN: May I say how very much I appreciate the honour done to me in being asked to preside on this very important occasion? Like well brought up children, Chairmen should be seen but not heard, and as I am very much in the company of my intellectual superiors this afternoon I am thankful to abide by that rule. I will, however, just say this: that we are singularly fortunate in being privileged to listen this afternoon to Professor Catlin, who has been a distinguished friend of India for a considerable number of years. It is especially suitable that he should give this lecture held in commemoration of another distinguished friend of India. Birdwood's activities were in a different field, but he and Catlin have this link of being true lovers of India, and their names join now in honour of Tagore, that great poet and great patriot of the Sub-Continent. We are all looking forward to what Professor Catlin has to tell us, and I think we are privileged to be his audience.

The following lecture was then delivered.

THE LECTURE

I

The history of the world until the battle of Marathon was substantially that of Asia and of North Africa—of Egypt, Phoenicia and Mesopotamia, of India and China—to which Afro-Asian civilization the Homeric and Greek world was only peripheral. To the Egyptians the Greeks, even the wealthy colonial Greeks of Sicily, were, like all Europeans, adolescents in wisdom. After Marathon the scene changes. The Greek civilization, supplemented in due course by those of Judaea and Rome and emergent Europe, comes to occupy the foreground of the stage of world history, with later occasional Moslem rivalry. In the words of the poet, *In Tibrim defluxit Orontes*. It is not the Tiber, on the contrary, that flows into the Orontes. The Celestial Empire of immemorial China remains isolated behind its walls, even if visited by Prester John or by a gaping Marco Polo.

So the situation remains until the Turks nearly defeat and, at the beginning of this present century, the Japanese do defeat, the Russian Empire single-handed. The empires of the Hapsburgs and the Hohenzollerns and the Romanovs depart—and not they alone. The civilization of Europe and its political leadership are torn apart, as Lord Cecil once said, by two desperate and avoidable civil wars in 1914 and 1939. To-day the Anglo-Saxon leadership finds itself in a minority in the

United Nations. Speaking personally, I have a profound faith that Atlantic civilization is not dying but renascent. This is a theme for another place and time. But what is yet true is that Asia, with its millions, so long eclipsed from its position as mother of civilizations and of religions, now rises again and expects to be heard. This is one of the great changes of our century. In the judgement of so wide-ranging a historian as Dr. Arnold Toynbee, it is the greatest. Although there may perchance be no new star of salvation arising therefrom, assuredly there is a new East. The great Asian Revolution, polarized on India and China, has taken place.

Mere reference, nevertheless, to 'the East' may involve deception. There are many, deeply different 'Easts'. And that of the Chinese, 'sons of Han', or of the Arabs is very distinct in mood and background from that of India, itself divided. It is extremely unfortunate that the phrase 'East-West relations' is so frequently used to refer primarily to the relations of the Atlantic world with the Soviet Union. It is true that Stalin once remarked to Matsuoka, the Japanese Ambassador, 'I also am an Asiatic'. But the implication is disastrous that all the East should be regarded as, because outside the Western sphere, hence inside the Sovietic sphere. This European-centred way of thinking may have aided in the evolution of a Sino-Sovietic sphere, unitedly 'anti-Western'. For India, which sees Delhi as the very navel of the East, this use of words is worse than meaningless: it is actively dangerous. Nations, like individuals, must not be lumped together under facile labels. They must be judged in terms of their particular traditions and leadership, political and cultural. For India the cultural leadership at the critical time of the new re-moulding was pre-eminently in the hands of three men. The birth-centenary of one of these three we here celebrate, in reputation less political than Mohandas Karamchand Gandhi and in the West better known than Aurobindo Ghose. Beside them stand other men scarcely less eminent, such as Tilak and Sapru and the elder Nehru, the father of Jawaharlal; and, in the generation of the younger Nehru, Radhakrishnan, Desai and others.

In 1930, a year before I first met Gandhi, I recall meeting at an American university, Cornell, Rabindranath Tagore, knighted in 1914 (a knighthood he resigned after the Amritsar affair of 1919), Nobel prizewinner, world-figure. Some years later, in Santinikētan where I had gone to lecture, I had the honour of sleeping in what had often been his bed. But on this earlier occasion he was the lecturer, and those present at the lunch were impressed by the silk-bearded, patriarchal figure of an Eastern sage, with his almost feminine, musical voice. He had come on from Italy and from Russia where, distributing kindly compliments, he had been welcomed with nearly regal honours. (Later, he was to express with emphasis his small opinion of dictators.) The Persian Shah had welcomed him as an official guest. The Germans had shown learned appreciation. Only Oxford University had bungled about giving him an honorary degree, since its wise men could not *guarantee* that he rated the level of their honour—an error belatedly rectified.

To keep the record straight and our judgement balanced, it must be said that, to many in the West, especially the Anglo-Saxon West, he seemed to mix a modestly veiled vanity with a somewhat whimsical gaiety of spirit. As 'Gurudev', 'the inspired teacher', *divino poeta*, he expected homage. His mysticism seemed misty

and his style reiterative, flowery and, in brief, monotonous. For reasons at this time not political but literary—he had indeed attacked the *raj* with fierce indignation over the Amritsar affair but, on the other hand, he had not supported wholeheartedly the movement of Non-Co-operation—some of the early gilt of enthusiasm had rubbed off since those early days when William Rothenstein and W. B. Yeats and Ernest Rhys had, in 1912, welcomed with ecstasy and introduced to the world the visiting and refreshingly new Bengali poet and painter, with his quick but felicitous spirit. Was he so profound, or were his Ganges' waters not a little thick with sediment and sentiment? One of the recurrent characters, pastoral, rather garrulous, in his plays was 'Thakurdada'—'lord big brother' or, better, 'lord grandad'. Was he not just Lord Grandad Tagore? Or was this a caricature?

II

'Thakurdada' was certainly not the character whom Rothenstein and Yeats saw or whom C. F. Andrews made his friend later. Few Englishmen have been, in the best sense, more entirely English than Henry Nevinson. It has always been a great regret to me that, as I know from correspondence, a distinguished literary society here demurred, on virtuous equalitarian grounds, from advancing the name of this great man for the public recognition he so pre-eminently deserved. Henry Nevinson was in an apostolic succession in letters from Goethe to his disciple Carlyle, and from Carlyle to the young Nevinson. The admirer of Tagore, the man, he was not a person to give his admiration lightly. With C. F. Andrews he was the man who, for Tagore, showed what an Englishman at his best could be. Each was the true ambassador of his country.

It is frequently forgotten that Tagore, a man of so many gifts, was a considerable painter. His flaming, impressionistic and van Gogh-like pictures can still be seen (as I have seen them) in abundance in his school and home in Santiniketēn, near Bolpur, in upper Bengal. On his visit to India, when he saw the Elephanta Caves, Rothenstein, later President of the Royal Academy, had met senior members of the Tagore family, such as Rabindranath's nephew, Abanindranath; but had had no significant conversation with Rabindranath himself. He was, however, aflame with interest in Indian art and when Tagore, almost solitary and without introductions, reached London in 1912 and nearly by chance made contact with him, Rothenstein discovered to his delight in Tagore a kindred soul, with a painter's interest. Moreover, this was at a time just before the great revival of William Blake; and Tagore had, in painting if not in poetry, much of the spirit of Blake. Also, by good fortune, Tagore arrived provided with a collection of translations of his Bengali poems, in large part made by himself on the voyage from India. Rothenstein found for Tagore a further admirer in Yeats, who saw in him an incarnation of the newly re-discovered East. The award of the Nobel Prize of 1913, with all that this involved in terms of international fame, followed in a traceable sequence. The poems of this time, collected, were published privately under the sponsorship (for which Rothenstein was responsible) of the India Society, and later by Macmillan, as the *Gitanjali*, a 'basket of songs'. They were among the most famous that the poet wrote. Shaw and Bridges and Masefield were introduced; Ezra Pound became a disciple. As

Sir William Rothenstein wrote: 'Your pilgrimage is one of the romances of literature'.

Rabindranath Tagore, it is important to stress, was a Bengali poet. As with a Welsh poet, this matter of topography could gravely have restricted his influence. What influence, we can ask ourselves, would Dylan Thomas have had, if he had written in Welsh? It is significant that, on the occasion of Tagore's Jubilee in Calcutta, Radhakrishnan in his address apologized for the fact that he himself had not a full command of the poems, because he did not know Bengali. Tagore has indeed had translators, such as Amiya Chakravarti, for a while his secretary (as was Leonard Elmhirst), and Aurobindo Ghose, as well as commentators such as Dr. Brajendranath Seal and Prasad Mahalanobis; and many of these have done excellent work. However, the supreme translator of Tagore is Tagore himself. Some of these translations are so free as almost to constitute new poems. At least they shed light on the interesting question whether the translation of a poet can be better than the original poetry. Without the fortunate accident of Tagore's admirable command of the English language (for which he occasionally unnecessarily apologized), his influence would almost certainly have been much reduced.

Rabindranath Tagore, however, cannot be understood only as the Bengali poet who ended up as the spokesman of India. There are indeed several Bengals. Besides the Bengal of Calcutta, where Tagore had a house, there was also the family mansion at Santinikētan in the tawny upland, some hours train-run north towards Darjeeling, a somewhat bare land but here adorned, as I well recall, with jacaranda trees. There was also an estate on the lower Ganges, the Padma; and any reader will note how the love of the great river permeates his poems. Beyond this, Tagore shared a training and attitude with one powerful group, spreading far beyond Bengal over all India. His lavish grandfather, Dwakanath Tagore, who had visited England, his father, the Maharshi or 'great sage', and he himself were all *zamindars* or major land-owners. But also they were Brahmins. Even when, like Franklin Roosevelt, Tagore was in reaction against his ancestral class, he was still part of it. The very name 'Tagore' derives from the title by which the early British merchants addressed all Brahmins. Moreover, the heritage and the tension were heightened by his father's devotion to the reforming Hindu school or sect of the Brahmo-Samaj, itself syncretic and with strong Christian influences, but culturally Hindu, founded in the early years of the last century by Raja Ram Mohan Roy, who was born in 1774. To this, although in more detached and independent fashion, Rabindranath also belonged. He was thus, culturally and socially, rather like a member of some great, traditional Conservative house whose father, like himself, had become a Liberal.

Tagore's fertile poetry assumes many forms, rhyming and *vers libre*, sonnet and epic—and, above all, that of short poems which could be set to music and sung by the villagers and by the boatmen on the Ganges. Just there, in the popular quality of the work of this great and withdrawn aristocrat, lay the major secret of his success and influence. To be frank, he was prolific to the point of verbosity and tedious repetition. He tended to the pretty, the sacharine—or, to use Edward Thompson's excellent metaphor, in his easier moments his sweet and fragrant inspiration tended

to resemble that beautiful water hyacinth which yet clogs the rivers of the Ganges delta and, as I have myself seen, the canals around the far forts of Mandalay. This pervasive sweetness is his weakness. Whereas the great Goethe uttered the maxim, 'never a day without a line', with Tagore it became almost a case of a poem a day. Admittedly he never became, thanks to a lyric quality, quite as flat as Wordsworth at his wordy worst; but such vast production did indeed spell an inflation which depreciated the value of his poetic currency, despite so many golden minted pieces. Tagore the poet was also Tagore the playwright and Tagore the great educationalist. Perhaps his private school at Santinikētan, founded in 1900, later to become his international university, his Visva-Bharāti, was too kindly with its father-figure, in encouraging and applauding his every production. However, sometimes we find that what has given forth sweetness is a lion in strength, *ex forte suavitas*.

What, then, is the value of the best of Tagore's poetic and dramatic work? In reaching a judgement on his work, it should be added, we must beware of what I can best call a chronological illusion. Because his Western reputation dates from his second visit to England (his first was in 1877) and the award of the Nobel Prize in 1913, we tend to think of him as a contemporary of the Georgians—of George V and even of T. S. Eliot. More humbly we recall those days when, along with Tagore's writings, those of Michael Fairless, with her *Brother Hilarius*, were popular and when, in inexpensive editions, *The Wisdom of the East* series sold so widely. Those were the days of the late Edwardian afternoon sunshine, before the Great War. But, in fact, much of Tagore's best work had already been done before the present century began. He was, that is, a Bengali Victorian. It is an indication of his stature that, whereas some think he 'dates' so much, actually he survives as a spokesman of India, dating so little. For his biography I must refer those interested to the works of Mahalanobis, and of Edward Thompson, to the comments of my friend K. R. Kripalani, as well as to numerous other contributors, including not least Professor Amiya Chakravarti and, of course, to the poet's own *Reminiscences*. My wife, in a centennial symposium of this year edited by Kripalani, has discussed the English influences on Tagore.

As a Bengali poet Tagore was the inheritor of a specific tradition and must be judged in terms of it. Indian history is as luxuriant and multiform as Indian sculpture. The European refers to the 'history of India'. But the Indian eye immediately detects differences: the area of the god-descended Rajputs, with their ancient rose-red cities; the area of the Malayalam tongue, which no Moghul emperor ever subdued, with its very early indigenous Christian population of several millions; the ancient Kingdom of Bengal, with its great wealth and separate language. Who, having visited these areas, can confuse the one with another? Further, the specific poetry of the Bengal villages of recent centuries has been under a Vaishnava influence, an influence of lyric religious popular song. This influence is both clear in Tagore's work and accounts for his early popular appeal to his countrymen. Like Hu-shih in China, who was acclaimed as the Dante of modern China—in terms, not of any *Divine Comedy* but of *De Vulgari Eloquio*—so Rabindranath Tagore became the great master and creator of a vernacular literature.

Whether he might not have achieved more, had he commanded Hindi, is another matter. It is part of the character of India that one of its greatest writers could use a language unintelligible to so many others. Fate had it that Tagore was very much a patriotic Bengali. Possibly for this reason he was never an Indian chauvinist. His tendency was to compare India, not to France or Britain, but to all Europe, if a United Europe. This emerges clearly in his *Creative Unity* (1922). His concern was with India's unity on a basis tolerable to each section. He was a world-citizen whose patriotism spread out from a centre in Bengal.

III

Tagore was a polymath in that great tradition which includes Aristotle, Aquinas, Leonardo, Diderot and Goethe—a tradition unfortunately more honoured to-day than imitated. He was painter, poet, singer, dramatist, actor, orator, political prophet and religious philosopher. Born 1861, we have to remember that he was the younger contemporary of Tennyson and Browning. Some would think of him as the contemporary of Maeterlinck, also a Nobel Prize winner, and of Sir James Barrie. It would be better to note his spiritual affinity with Romain Rolland. It is the weakness of such wide humanism that it makes itself vulnerable to those who, not knowing something about everything, do yet know everything about something. It is quite impracticable—and anyhow beyond my powers—to survey with adequate attention all Tagore's activities. On this commemorative occasion, however, I do propose to pay some attention to Tagore's work as political guide and as what Gandhi called 'the Great Sentinel', watchful of India's and of humanity's treasure of spiritual values.

In some ways Rabindranath's political career was unexpected. He regarded himself as the singer and poet, who declined to dedicate his life to struggle in the midst of the political fray. He was only once seen at the annual meeting of the Congress Party when he sang *Bande Matāram* to a tune he had designed himself. Like Fletcher of Saltoun, he preferred giving to the people their songs rather than sitting in some legislative assembly, making their laws. Himself of Brahmin stock and a wealthy Bengali *zamindar* or land-owner, the grandson of Dwakanath Tagore, who was known, from his almost spendthrift magnificence as 'the Prince', with a family name which means 'lord', he liked to think of himself as being 'where the pathmaker is breaking stones', and was over-enjoyed that the common people sang his songs.

In the words of K. R. Kripalani, in his *Gandhi, Tagore and Nehru*: 'All his life he planned and strove for social justice, for the right of the poor to material well-being, of the citizen to self-government, of the ignorant to knowledge, of the child to unfettered development, of the woman to equal dignity with the man.' He saw an economic remedy for distress in increased 'socialization', coupled with local government development. With so many others of the period, he shared the admiration of 'that red dawn' of the Russian Revolution and of the Soviet Union of the 'Twenties—not least because of the advances in popular education, and to an extent that, in retrospect, may seem uncritical in terms of his own chosen, and very individualist, standards. He himself, at Santiniketan and elsewhere, was no mean

pioneer of national education. Even rural reconstruction and encouragement of co-operatives were not beyond his reach. One of the most interesting of contemporary complaints about British India, made by Kripalani, was that the budget for maintaining 'Law and Order' of the *raj*, left very little over, it seemed, for any educational enterprises. This was also part of Tagore's concern.

Four political events indeed stand out in Tagore's life. All are marked by the characteristic of moral indignation. In 1900 he published his *Stories and Tales*, a collection of patriotic songs. He campaigned against the administrative division, under Lord Curzon, of the ancient Kingdom of Bengal—a problem still with us and to which I shall return. Two decades later, in a famous letter, he resigned his knighthood after the Jallienwalla Bagh affair, with which the names of General Dyer and Sir Michael O'Dwyer are connected. Writing in 1919 to the Viceroy, Lord Chelmsford, while paying tribute to 'the nobleness of heart' of his predecessor, he concludes, 'the time has come when badges of honour make our shame glaring in their incongruous context of humiliation, and I for my part wish to stand, shorn of all special distinctions, by the side of those of my countrymen who, for their so-called insignificance, are liable to suffer a degradation not fit for human beings'.

Later still, the *swaraj* movement, with its demand for refusal to use foreign cloth and for a concerted policy of non-co-operation, swept India. Usually, Gandhi and Tagore, who first met in 1915, stood together. Most of us have seen the famous photograph of those two *patres patriae* seated beside each other, taken in Santiniketan. But, on this occasion, Tagore was alarmed by the isolationist excesses of *swaraj*; he feared a chauvinism not impossible in Bengal; and, as his manner was, he withdrew into himself and into his beloved school near Bolpur. There is an unwonted note of asperity—but, after all, the Mahatma was capable of impatience—in Gandhi's comment: 'I have found it impossible to soothe suffering patients with a song from Kabir'. Tagore, on the other hand, the champion of Raja Ram Mohan Roy of the Brahmo-Samaj as against Gandhi's view, saw what he supposed to be 'the distracted mind of the West knocking at the gate of India' for its peculiar wisdom. 'And is it to be met by a hoarse shout of exclusion?'

The fourth great event, of the Second World War, found the two leaders together. Japanese admirers, years before, had asked for Tagore's sympathy in Japan's action in China. The circumstances, Noguchi claimed, were unique. 'Military circumstances', replied Tagore, 'are always unique.' In 1940, just before Tagore's death, Eleanor Rathbone, a woman not marked by tact but of great integrity and of admirable intention, appealed to Tagore to persuade India to come into the war against Hitler, whatever the human cost, on the side of freedom. His reply was fierce. If the war was for human and national freedom, what freedom did India enjoy? India had been brought, by the *raj*, into the Second World War without even being paid the respect of being consulted. No wonder Sir William Rothenstein, even thirty years before, had been warned by the Establishment, when he determined to visit India, 'lest he encourage the Nationalists'. The brute issue whether Hitler was to win or lose—or, for that matter, whether Stalin was to win or lose—was not one that weighed with the mind of the poet, who shared much of the pacifism of the Eastern sages. With justification he resented a moral lecture from

those who, however honest and even excellent their intentions, in the name of a *jihad* for freedom, withheld political freedom from India herself.

If I may venture to take in vain the words of a very great man, there are three things by which I personally should wish to be remembered. I may have made some contribution to building a political science and to getting it taken seriously; and I hope that I have added to the arguments, and have indeed propaganded, for the integration of an Atlantic Community. But chiefly I like to recall that I had the honour of being draftsman of the International Declaration in Support of Indian Independence of 1943, which was signed by several Members of the British Parliament, some of whom were later to become Privy Councillors and Ministers. The issue was precisely whether India was to be offered Home Rule, defined in London, as an act of grace; or whether India was to be, not sullen, but formally free to follow *her own* deliberate choice, whether as republic or otherwise, and whether within the Commonwealth or without.

These were the hot issues of 1943-7, when some of us were happy to join with Sir Stafford Cripps, against even the majority of the Opposition, not to speak of the Government, in urging (with the sad Irish history in our minds) the bolder solution, because we also believed that it would prove to be the happier one. Although history for a while, with unhappy events in the Punjab and Bengal, paused with suspended balance, we have no cause at all to regret a solution glorious in our annals. Nor is it beneath notice that, at the beginning of this time, encouraged by Agatha Harrison, by Messrs. Amiya Bose and Pulin Seal and by Dr. Codrington, while bombs were falling in London in 1944, in the Alpine Club in Audley Street, a quite creditable exhibition of Indian sculpture and art was held, drawing attention to India's great heritage and contribution; and also a Tagore Society (formed in 1936, by Mr. Seal) was revived, of which your lecturer had what he felt to be the no small honour of being vice-chairman. To this extent Sir William Rothenstein's, and Yeats' and Henry Nevinson's tradition of honour for Indian culture and for Rabindranath Tagore's especial contribution, was maintained, even under war conditions.

My sole regret here is that a considered and well-supported plan, by Hindus and Moslems alike, for maintaining the unity and a measure of autonomy for the great and once individual Kingdom of Bengal, in which plan I had some finger, unhappily proved abortive—nor was it greatly aided by the then British appointee as Governor of Bengal. At least, however, if this failed, I had the double happiness of visiting India, in 1947, at the time of the Cripps Mission, at the invitation of the then President of Congress, Maulana Azad, and then, a second time, in 1948, for the Inter-Asian Conference in Delhi on the invitation of the Conference President, Mrs. Naidu, and of visiting then Santinikētan. However, all this I have described elsewhere.

IV

Tagore's political career may have been detached and spasmodic in its incidents. His leadership in political ideas was not—and indeed was given precise literary formulation in lectures in Japan, the great emergent Asian country of the early years of this century, as well as in the United States, later published in 1920 as

Nationalism, as well as in his still later (1934) correspondence with Gilbert Murray, published as *East and West*, and in his *Crisis of Civilization*. I may speak with the bias of a political philosopher but, his plays apart, his *Nationalism* seems to me to be the most important of his prose works. Certainly it throws a flood of light in the explanation of what may seem to be inconsistencies in his practical political activities.

To begin with, India was for him 'not a Nation'; and he registered his alarm at the thought that India might become one, in the peculiar sense in which he chose to use that term. It is necessary here to appreciate the idiosyncratic but important sense in which he uses the word. It is sharply different from that in which the Abbé Renan, who defined it as a perpetual plebiscite in living together, or in fact most political theorists have used it. It is not the tribe nor the People; and is set in contrast to the People and Society.

The Nation is 'a machinery of commerce and politics'. 'It is like a hydraulic press whose pressure is impersonal.' It is an organization of power; and those under it are 'continually turning the wheel of power' for their own sake, 'or for the sake of the universal officialdom'. It was a bloodless metaphysical abstraction, or rather a practice into whose values men did not inquire because they were blinded by a mental stereotype—what Hobhouse called 'The Metaphysical Idea of the State' and what to-day, less reverently, we dismiss as 'metapolitics'. Varying his metaphor, Tagore speaks of 'the Nation fixing its fangs deep into the naked flesh of the world'. 'Great China' was among its predestined victims. It all involved a dehumanizing process—what to-day, in our current jargon, taken from the French, we call 'alienation'.

As for the Nation's servitors, they were 'men of limited purpose', what the Confucians call 'small men', *shiao-ren*, the opposite of what Confucius called 'gentlemen', *chun-tse*, and Aristotle called *megalopsuchoi*, 'the great-souled'. It has been wittily said to me, by the Sardar K. M. Panikkar, that 'India for a century was governed by Knights Commander'. However, this must not call up some romantic feudal scene of armoured and bannered men streaming to war. Rather it was of one of very honourable men in trousers polishing office seats—and, honourable men or otherwise, being, in Tagore's eyes, not very sympathetic or even very imaginative bureaucrats, whether decorated or not as Commanders of the Order of the Star of India or of the Indian Empire. This was 'government by the Nation'—the remote, uninformed, bored British public, which, as every parliamentary candidate knows to his cost, is far more interested in football than in overseas dependencies and expects its representatives to 'attend to the grass roots', i.e. to Wigan's bread and butter.

Is this ogre of Tagore's—'the Nation of the West bursting in' on India's spiritual quiet—not so much 'Nationalism', as purely 'administrative Government', like the Austro-Hungarian State under the Hapsburgs? But such a static administrative machine, however preoccupied with 'law and order', would not correspond with what Rabindranath Tagore feared. What alarmed him is where an organized and power-preoccupied people, even if authentically concerned for welfare and the relief of destitution, can impose their will upon another people. 'The Nation is

the organized self-interest of a whole people where it is least human and least spiritual'. What he saw was not 'the Ugly American' of to-day, offering dollars and expecting results, but what he regarded as 'the Ugly Englishman' of yesterday, asking for rupees from India in the form of profits on trade. These stereotypes, shaped by indignant passion, as he himself would have admitted, are not entirely just. What in politics is?

He welcomed with open arms the impact of the *ideas* of West upon East and of East upon West. So far, as much as Goethe, he was a great world-citizen. As the last chapter of his book *Creative Unity* shows, it was precisely to inculcate at once Indian culture and the perspectives of world culture that he founded what was to be his International University at Santinikētan, his Visva-Bharāti, where 'music and art would have their prominent place of honour'. Here, like Goethe, he rises to the heights of being the apostle of Universal Man. But he resented a novel and, for him, upstart system, however named 'democratic'—that of the organized *will* of one people being imposed upon another. He resented a situation where a man who might be one degree short of certification for mental imbecility could contribute his millionth part of a popular will, that of an exclusive Nation, to put a yoke upon another people, be it in Kenya, Cyprus or India, whose people had no vote. Whereas 'the seed of Romulus' in Rome were prepared to be 'paid off', and to take the rewards of empire in doles and entertainments, the English, Scots and Welsh, having got as far as calling themselves the British nation, have never been prepared to follow the clear logic of empire farther, admitting Maltese and Kikuyu and Rajput to full citizenship and being ruled, like ancient Rome, in one decade by someone Spanish-born like Hadrian, in another by an Arabian, and perhaps by an Indian. The farthest they got was the Venetian-descended Disraeli. The British, unlike the Romans, proposed to eat their cake of empire and to keep their cake of nationalism too. They acquired their Empire 'in a fit of absent-mindedness' and, to tell the truth, never took it quite seriously. Let us hope that their philosophers and statesmen, guardians of a world language (the importance of which they have hitherto, unlike the French, ignored), will take the Commonwealth seriously. The rights of a 'true-born Englishman' did not entirely extend, beyond an insular application, to 'overseas possessions' (significant word) where there could be peculiar acts for deportation of subjects to other colonial areas or for their detention on security grounds, unknown—or almost so—in the homeland. The old Empire contained an internal contradiction.

What, above all, outraged Tagore was that an educational system, designed by the Scotsman, Lord Macaulay, should be imposed like a strait-waistcoat upon the great Indian culture, with which Tagore, as poet, was especially concerned. 'Let us not exist', he writes in *Creative Unity*, 'as the eternal rag-pickers in other people's dust-bins.' Culture must be free; must be autonomous. Whether he would have appreciated a Hindi culture being imposed upon Bengal is another matter; and we do not know the answer. Certainly India was not 'one Nation', in his sense, for him. It is here, in this passionate emphasis upon cultural autonomy, in its fight against administrative efficiency—not to speak of alien exploitation or even of alien bounty—that Tagore is at his strongest and his message most immortal.

It is here that he authentically provided, in his ideas, a world political leadership. Perhaps we have now taken the message to heart. One notes the remark of the Colonial Secretary, Mr. Iain Macleod, already in this year (3rd January), that welfare facilities are no substitute for political rights nor must arguments of economic efficiency, as against local tradition, be considered to be decisive. People, granted some respect for others and for human rights, must be permitted to grow as they choose, and to make their own beds on which they have to lie.

It is obvious that the poet was scarcely a comfortable and conforming member of a dynamic Indian nationalist movement. As Dr. Humayun Kabir has remarked, in his illuminating little book, *The Indian Heritage*, 'Blind rejection of the West is to-day (1940) the prevalent temper of Indian society. . . . The confusion of nationalism with obscurantism in modern India has often attracted notice.' These were errors into which Tagore never fell. Anyhow, as already remarked, a supporter of Brahmo-Samaj, he was also a Brahmin but a kind of heretic one. 'Society itself', said Tagore, far from being preoccupied with power, 'has no ultimate purpose. It is an end in itself.' Nevertheless, it does require a measure of organization as touching its means.

India, let us emphasize—like Italy with Mazzini; and Germany, we may add, under Conrad Adenauer—has been blessed by having as its great leaders of thought and action, at a time of fundamental political crisis, three men, all verily *patres patriae*, founders of Modern India, but also dedicated internationalists and world-citizens, Jawaharlal Nehru, Rabindranath Tagore and Mahondas K. Gandhi—Panditji, Gurudev and the Mahatma. In the words of Tagore, 'we have to consider that the West is necessary to the East. We are complementary'. We may yet entertain the doubt whether, when Tagore writes, 'I am against the general idea of all nations', then, in the common meaning of the words (if not in his own), he does not go too far and ignore significant community values. But when he writes, 'There is only one history—the history of man'—his voice is in accord with that tradition which is that of Buddha, of St. Paul, of Erasmus of Rotterdam, and of Goethe, the greatest tradition of Humanism.

V

Rabindranath Tagore was not a politician and did not claim to be an economist. He was far rather the spiritual leader. The poet was also seer. To ignore this side of him is like seeing the body and the flowing robes, but failing to observe the head.

In this capacity he had advice to give to 'the West'. (Tagore, be it said, talked rather freely in the bloc terms of 'the East' and 'the West', very questionable although these are. Emphatically he saw European civilization as a unity.) Thus he writes that the West 'is growing incapable of imparting to the East what is best in herself, and of accepting in a right spirit the wisdom that the East has stored for centuries'. His view is not unbiased. Almost certainly he underestimates the part played by English and Scottish scholars in encouraging the renewed study of Sanskrit literature, as well as in working for the preservation of Indian monuments—a matter in which indeed Lord Curzon holds a very honourable place.

Tagore here was rather concerned about a certain lack of imaginative awareness. He saw the European and the Anglo-Saxon West as characteristically activist,

competitive, aggressive; and Tagore had no use whatsoever for what, thanks to Messrs. Tawney and Galbraith, to-day we call the Acquisitive and even the Affluent Society, which he regarded as vulgarized by the profit-motive and as a detestable commercialization or exploitation of human life. When he has finished his denunciation, one is inclined to remember that Tagore was a rich man and to sympathize with Gandhi's remark, already quoted, that the sufferings of the common people, for all Tagore's aristocratic sympathy, were not to be solaced by readings from the poems of Kabir.

Tagore emphasized that the problem of India was social rather than civil-political. But here he was not so much concerned with economic problems of under-development and of what Professor Rostow would call 'the take-off', but with the racial question. While he firmly condemned the rigid caste-system, as a weakness of India, he was prepared to justify its origins as what might be called an attempt at 'peaceful co-existence' among India's various races, Aryan and Dravidian—an attempt, he thought, more successful than that in South Africa or in the Southern States of America. Spending his time between Calcutta and the Bengal countryside, he was, like Ghandiji, a defender of the village. Like Gandhi, he protested with all his heart against human civilization being shaped and considered, archetypally, upon the pattern of what fitted most efficiently into the requirements of Heavy Industry—as tends to be done alike in the Soviet Union and the contemporary West. Rather he wanted the pattern to be found in the rational human needs of the consumer—perhaps some day the consumer of leisure—first satisfied in terms of a society of co-operatives and Light Industry. Being no economist it cannot be said that he ever successfully brought the two needs together. But, in terms of the human hopes of a sane society, his intention was right.

Above all, he did not feel that the wealth of India was to be found always by leaping on to the car of commercial progress and by embracing all and everyone of the inventions of natural science. His views were rather of one kind with William Blake's. In the recent controversy started up by Sir Charles Snow about the educational values of the natural sciences and of the humanities, he would have come down imperiously to warn us against Sir Charles as a heresiarch, an enemy of culture. He did not hesitate to refer to 'the vulture, science'.

He perhaps underestimated, unlike Plato, what the natural and mathematical sciences have to contribute to a rational culture, although he was probably not wrong in regarding the product of undiluted training in the natural and mathematical sciences as a barbarian. To quote again the wise words of Dr. Humayun Kabir: 'The instrument of attack of our global civilization is the machine, which liberates human energy and creates the possibility of leisure for every human individual. . . . The higher standard of material civilization achieved by the West served as a challenge and an irritant.' Certainly for Tagore it was, in its commercial blatancy, indubitably an irritant. He did not realize that, in the words of Sir Charles Snow, 'industrialization is the only hope of the poor'. He confused it with competitive commercialism, and failed to see that the alternatives were either the greater misery of the villagers or that unwanted populations

should choose to remove themselves from the earth. In his view 'the West' was like a man tone-deaf. He could see the fingers of the musician's hands mechanically striking the chords. But such a man was incapable of appreciating the glory of music.

Since the problem stated so passionately here, by Tagore, as part of his central message, is so important and is to-day so urgent for us, let us, in the conclusion of this address, for a few minutes direct our minds to it. How far are we not preaching, in education, the importance of technical studies, not from love of craftsmanship, but because we have an eye to defending competitively threatened export markets, instead of criticizing the very nature of a production-obsessed affluent society in the West, growing ever richer, in contrast to an agricultural East, growing ever poorer? Dr. Carrington tells us that the physical sciences can stimulate our imaginations more intoxicatingly than any religion. But one wonders how far this is not an intoxication of power; and whether our sudden frenzied concern with physical science, Churchill Colleges and the rest, is not fundamentally a military matter, having little to do with education for a balanced society.

Does not the darling sin of the West lie in this direction? One may be pretty sure how Tagore would have replied. I am not so convinced myself. Let us grant that the comfortable high-life civilizations of Scandinavia or Australia are not so happy after all; and that the Welfare State is a partial but not a complete concept for society. In Gunnar Myrdal's words we have to look 'Beyond the Welfare State'. A simple society can be very happy and have far more respect for the human dignity, about which we prate so much, than Chicago or Johannesburg. Nevertheless, with so much of the human race living near the starvation line, let us recognize that the machine, if kept under control, the harvest-reaper, the hospital equipment, the hydraulic power station, can do much to alleviate that not inevitable distress. Nor need the macabre methods of Russia and China, by hanging profiteers and then issuing certificates to the aggrieved of their capital execution, be the only means of controlling the machine. Maybe that, in the end, peace will only be brought to the world by a ruthless and Hobbesian autocracy impatient of all democratic committeeism and Indian opiates. But one hopes not. The voice of Reason may not be so devoid of power.

It would be inconsistent with the pattern of Tagore's thought to explore farther the economic problems of our civilization. His distrust of science—and one suspects of social as much as of physical science—goes deeper than dislike of the appanages of a commercial-minded, production-mad, 'adman's' civilization. He dislikes it, as Burke did, because in its own way it is oddly metaphysical, a matter of 'velvet-pawed, green-eyed philosophers', cat-like metaphysicians, mathematical, abstract, cold, impersonal and anti-human. When it hatches creatively, it hatches as its egg a hydrogen bomb; and then, asked about its moral responsibility, replies like some Pilate of the laboratories, 'Are not all morals relative?' If truth, to which scientists and academics pay homage, is absolute, then it is not relative. If truth is relative, then this truth of the scientific humanists also is relative, and there is no reason why we should sacrifice calculated self-interest and power to what is merely relatively worth while, without an imperative. Tagore is never tired of telling us

that Reason is something other than the intellect; that power is the means to full life but not its master; and that India has always known this. As for Japan, let her beware of imitating the Western sorcerers, the Western secularist blasphemy. After 'the Age of Reason' came the age of intellect, of science. We all know that intellect is impersonal. . . . Reality, however, is 'the harmony which gives to the component parts of the thing the equilibrium of the whole'. 'The vital ambition of the present civilization of Europe is to have exclusive possession of the devil.' It blasphemes against beauty, who is God. And its fate will be that of Babel, a rolling up the heavens in that day of wrath, a rolling up in very fervent heat, *solvet coelum in favilla.*

What, then, is this wisdom of the Upanishads, in which, as rephrased by Raja Ram Mohan Roy, Tagore very profoundly believed? And is it wisdom? Let us grant the crucial importance for our civilization of studying the means of power, as Faust did of old. 'Thou shalt then learn how move the stars', says Faust. Soon the brain, as much as the bomb, will reveal its secrets, to be under the control of the physician, the psychologist, the manipulators and hidden persuaders. But is Mephistopheles, offering power, the only guide beyond? Is there no end, no purpose, no content, but only 'Sound and fury, signifying nothing', chaos being king—but all viewed efficiently on a three-dimensional screen? Is the end the apotheosis of phenomenalism—what the Indian calls *maya*? The poems of Tagore express his own answers. Are they rationally satisfying, as Gurudev certainly thought that they were?

Before giving an answer, it may be well to state the theme in the reflective language of an Indian philosopher, the speaker at Tagore's Jubilee in Calcutta and now Vice-President of India, Sir Sarvepalli Radhakrishnan. He is himself the author of a book, *The Philosophy of Rabindranath Tagore*. Like Tagore, he emphasized that the European contribution to human culture, unlike the Indian, is in its essence intellectual, a matter of what the Germans call *Verstand*. However, 'the living, the concrete, the individual is distinct from the merely logical'. So far I do not think that either natural scientist or historian will object. What, however, these Indian writers are affirming is that there is a reality beneath the phenomenal, although also immanent in it. I do not think it can properly be said that the teaching of the Upanishads is simply pantheist or solely immanentist. It could be said that they disregard the immortality of the individual. But it must be noted that Tagore quite specifically did not do this. According to Humayun Kabir he is even too much the individualist, the solitary. For him, reality transcends, but sustains and is incarnate in, the material. There is a creative energy. *Tapo Brahma*. Religion is not concerned just with happiness but with a co-operation with this energy; virtue is such an energizing. In a striking poem, for which again I am indebted to Mr. Aurobindo Bose, Tagore, who claimed he had 'no caste', writes:

I will say
'It is truth, therefore poetry'.
This is my pride—
Pride on behalf of all men.
It is in the canvas of man's pride
That the great Artist's art is shown.
(*Poems of Wonder*)

The contemplation of beauty, great art, aids in such a selfless or self-detached empathy. With serenity of spirit the world of joy reveals itself in innumerable forms: *anandarupaam amrtam yad vibhati.* This is the message of Tagore's own Hibbert Lectures of 1931, *The Religion of Man.*

The question I would wish to put is how far this teaching is specifically Indian—or Eastern. That the whole universe is in travail and is designed to evolve towards a culmination in the fine structure of the mental, the intelligent, the purposeful, and that what contributes even the smallest mite thereto is properly called 'good', is the theme of a great Frenchman, not indeed uninfluenced by the East, but by the very different East of China. The whole material universe is one vast field, potential for incarnation, reaching to incandescence here and there, of reason or *Logos* or spirit. What to some is mystery and opaque veils, to other significantly symbolizes and declares the very nature of the cosmic process; shows the reality incarnate; and permits the beauty of the fundamental harmony to blaze forth. *Lumen aeternum mundo effudit.* In the whole world of quality, with which category by the nature of our minds we necessarily make contact, here and there we apprehend pre-eminent value. I quote. 'Nothing less than this full presence', of the creative spirit, 'is needed to counterbalance and dominate in our hearts the glory of the world that is coming into view.'

Some here will prefer to talk in terms of the destiny described by a logical dialectic. Others will feel it nearer to the truth to say: '*Et elevata est magnificentia Tua*'. Allowing for differences in orthodoxy of expression, what I have quoted seems to me to express, alike in active aspiration and in intellectual intention, almost exactly the same pattern of thought as Tagore and Radhakrishnan have expressed. Power over means, not evil in itself, is here recognized, articulated and transcended in the only fashion in which, in my view, it can be transcended. Power as means finds its valid end in the realization of beauty. As you may have recognized, the author of the quotation is the distinguished French Jesuit, Père Teilhard de Chardin, in his *Milieu Divin.*

Despite whatever may be said by critics, both of style and of literary fashions, 'the Great Sentinel', the poet of India, the humanist and world-citizen, peer in his own fashion of Dante, Erasmus and Goethe, is likely not only to be recalled as one of the founding trinity from which Nehru's India has sprung, but to remain in his own right immortal. This will be because he was able to sing songs in the river villages of Bengal or in his school by Bolpur but, still more, because he was able to intuit and to express verities which are not those either of India or of the East alone, but of the profoundest human spirit. It has recently been said by the Warden of All Souls, addressing the British Academy, that essentially great poetry may be defined as the product of a great poet. Assuredly Tagore was a great poet. It is an honour to pay homage to him and—as he himself would have liked it—to what is yet greater than Tagore, to the Mother India that produced him and which has, through the centuries, always been able to express one mighty aspect of the human spirit itself.

THE CHAIRMAN: Professor Catlin has done all that anyone who is delivering a

lecture could do, in that not only did he tell us a great deal about the subject of his discourse, but also stimulated us to find out more about the man for ourselves. I myself will certainly renew my somewhat superficial acquaintance with the work of Tagore. I feel thoroughly stimulated and wish to know all that I can about him. We are well aware of Professor Catlin's many commitments and deeply grateful to him for coming here this afternoon.

May I also thank the joint sponsors of this afternoon's meeting? To the Commonwealth Section of the Royal Society of Arts may I express gratitude for providing this beautiful room and also for your hospitality beforehand. To the other sponsoring societies our thanks are also due for making this afternoon possible.

Professor Catlin, by your lecture you have added real lustre to the celebration of the Tagore Centenary, and all of us who are interested in India and Indian culture will be for a long time in your debt.

The vote of thanks to the Lecturer was carried with acclamation.

MR. OSWALD P. MILNE, F.R.I.B.A., J.P. (Chairman of Council of the Royal Society of Arts): I have the pleasure of expressing thanks on behalf of the societies represented here to the Duke of Devonshire for coming this afternoon to preside. We know, Sir, how great is your interest in the life of the Commonwealth, and we welcome you, and acclaim you for adding distinction to this afternoon's proceedings.

The vote of thanks to the Chairman was carried with acclamation, and the meeting then ended.

GENERAL NOTES

ROMNEY EXHIBITION AT KENWOOD

This year's summer exhibition at the Iveagh Bequest, Kenwood, consists of paintings and drawings by George Romney, one of the most fashionable portrait painters of the later eighteenth century. Romney has not been the subject of a public exhibition since the big Grosvenor Gallery collection in 1900, which, however, was almost entirely concerned with the works of his maturity. The Kenwood exhibition starts from the beginning of his career, so that the influences which eventually fused into his mature style can be appreciated, and a re-assessment of his achievement made. In addition to pictures, the display includes items from the private records of Thomas Greene, Romney's patron and business adviser.

There is no charge for admission to the exhibition, which is on view until 30th September. The Iveagh Bequest is situated in Hampstead Lane, N.W.3.

'ARCHITECTURE TO-DAY' EXHIBITION

An exhibition of photographs showing some fifty outstanding British buildings of the last ten years is on show at the Arts Council Gallery in St. James's Square, S.W.1, from 28th June until 29th July. The exhibition has been designed by Mr. Trevor Dannatt and Mr. Alan Irvine, and the buildings, which are all the work of architects registered in this country, have been selected by a panel of judges including Mr. Lionel Brett, Sir Hugh Casson, Mr. John Piper and Mr. J. M. Richards. Admission costs 1*s* 6*d*.

STUDIES IN THE SOCIETY'S ARCHIVES XIX

The Society of Arts and the Committee of the Privy Council for Trade, 1789–1815 (ii)*

Wheat Meal Biscuits, 1790

On 30th March, 1790, the Committee asked the Society to work out the amount of meal which a quarter of wheat might, on the average, be expected to produce, so that it could determine the bounty to be granted on the export of biscuits made of wheatmeal.[1] A bounty of five shillings a quarter to be paid on wheat exported—providing internal prices remained below a certain level—had been embodied in succeeding English Corn Laws from 1673 onwards.[2] In 1790 a new law was under consideration by the Government and Parliament, and the Committee of the Council for Trade was naturally involved.[3] To extend the bounty on wheat to biscuits made of wheatmeal was a logical development of previous policy. The problem which faced the Committee was how to determine the amount to be paid. It was decided to approach the Society of Arts.

The Society referred the Committee's letter to its own committee of agriculture,[4] which held two long meetings about the matter. Written as well as oral evidence was received. The committee of agriculture first of all determined on a bounty of *1s 3d* a hundredweight,[5] but it was asked to reconsider the matter by the Society as a whole, and it eventually decided that, 'as a Quarter of Wheat weighing 456 lb. produced 364 lb. of net meal and as 112 lb. of meal produces 100 lb. of Merchantible Biscuit, it appears by calculation that the produce of one Quarter of Wheat or 364 lb. of meal will produce 325 lb. of Biscuit and if the Bounty on Biscuit exported is to be ascertained by rate of 5*s*. per Quarter on Wheat, then the Bounty on 112 lb. of Biscuit should be twenty pence and 44/65 parts of another penny [*1s* $8\frac{44}{65}$*d*.]'.[6] Although the experts in the Customs' House would have thought nothing of the complexity of this figure, which was forwarded to the Committee for Trade with the Society's approval,[7] the Act of Parliament of 1791 fixed the bounty to be paid on exported biscuits made of wheatmeal at *1s. 6d.* per cwt.[8]

Cashew Gum, 1790

On 3rd February, 1790, the Committee heard a petition from James Louis Desormeaux,[9] a member of the Society, stating that he had imported sixteen cwt. of Cashew gum from Jamaica 'induced by a premium offered by the Society for the encouragement of Arts, Manufactures and Commerce and from a persuasion of its use in printing, dyeing, etc. and praying that such a Duty may be fixed thereon as will be an Encouragement for the importation thereof'.[10] Since 1788 the Society had offered a premium for the importation of Cashew gum 'from any of the British Islands in the West Indies',[11] and in October, 1789, Dr. Isaac Titford of Jamaica had responded to the offer by sending a shipment to Desormeaux.[12] It was this shipment that prompted Desormeaux's petition to the Committee of the Council for Trade.

The Committee decided to allow Desormeaux to have the Cashew gum at the same rate of duty as was payable on gum Senegal 'as it appears that the said . . . gum is imported for the purpose of Experiment, the success of which may prove highly advantageous to His Majesty's West India Islands, and to the Manufacturers of this country'. A letter was ordered to be written to Samuel More 'desiring that as soon as the Society shall have come to any determination on the merits of the said gum, Mr. More would acquaint their Lordships therewith'.[13] The Society's committee of colonies and trade considered the matter on 16th February and on 20th April. It

*The first part of this article appeared in the April, 1961, issue of the *Journal*.

James Louis Desormeaux, 1745–1815
(*from a silhouette in the possession of his descendant, Mr. Walter Saunders Taylor*)

recommended the award of a gold medal to Dr. Titford and forwarded to the Lords of Trade its conclusion 'that the Cashew gum does not answer the purpose of the Calico Printer, yet . . . it answers the purpose of Gum Senegal in dyeing and dressing Black Silk in which Business there are great quantities of Gum used'.[14] Their Lordships took note of this opinion on 10th May, when they ordered the preparation of 'a Clause to be inserted in a Bill to be brought into Parliament for permitting the Importation of Cashew Gum from His Majesty's West India Islands on the same Duty and no higher than is now payable on Gum Arabic and Gum Senegal'.[15] On 9th June, 1790, the Royal Assent was given to an Act of Parliament incorporating this provision.[16]

M. Bourbillon de Bonneuil's Mineral Alkali, 1790

On 1st May, 1790, the Committee referred to the Society the petition of Monsieur Bourbillon de Bonneuil, who hoped to obtain an exemption or drawback from the duty on the salt he used for his manufacture of mineral alkali near Liverpool.[17] The Society's committee of chemistry decided that they could make no report until they had received a sample of de Bonneuil's alkali weighing at least 1 cwt.[18] De Bonneuil was ordered by their Lordships to comply with the wishes of the Society, but as he seems to have produced only 43 lb. for examination the committee of chemistry was still unable to report on the matter.[19]

Messrs. Godfrey & Higgins's Method of Stamping Linen & Cotton, 1790

Another matter upon which the Society found itself unable to give the advice

requested of it was the method of stamping linen and cotton said to have been discovered by Ambrose Godfrey[20] and William Higgins. Godfrey and Higgins, like Bourbillon de Bonneuil, had originally petitioned the Lords Commissioners of the Treasury and had been referred by them to the Lords of the Committee of the Privy Council for Trade.[21] The Committee wrote to the Society on 12th May, 1790, asking it 'to examine into the Merit and Utility of the said Discovery, and report their Opinion thereupon to this Committee . . . whether the Inventors are entitled on this Account to any Reward from the Public'.[22] The Society's committee of manufactures met to consider the matter on 9th November, 1790, but could not proceed because Godfrey had fallen ill.[23] There appears to be no further mention of Godfrey and Higgins in the Minutes of either the Society or of the Committee of the Privy Council for Trade.

Nicholas Brooke's Letter from Leghorn, 1790

On 24th November, 1790, the Society decided that a long complaint about the decline of the Exeter woollen trade, which it had received from a correspondent in Leghorn, was 'too difficult and important for their interference' and that it should be referred to the consideration of the Committee of the Privy Council for Trade.[24] The Committee does not appear to have taken notice of the matter. The letter is nevertheless interesting as evidence for a decline in the overseas market for Exeter woollens beginning before the outbreak of the Revolutionary Wars.[25]

Difficulties Over Patents, 1791 & 1796

Under the Society's rules and orders consideration could not be given to inventions for which it was hoped a patent might be obtained. On two occasions this rule was to prevent the Society from proceeding to investigate a matter referred to it by the Committee of the Privy Council for Trade. The first was in February, 1791, when the Society received 'Eight Papers from the Lords of the Committee of the Privy Council for Trade on an Application to that Board relative to a Patent to be granted for an Improved Method of Making Pot and Pearl Ash'. Samuel More was ordered to write to the Committee saying that 'the Society are fully sensible of the Honour their Lordships intended . . . but not having it in their power consistently with their Rules and Orders, to appoint a Select Committee, and a Member having declared in His Place that one of the Papers referred contains an Account of the Process, which if generally divulged may be injurious to the Party applying for the Patent, the Society cannot take the said papers into consideration'.[26] The Committee took notice of the Society's decision on 24th March, 1791, and ordered that the petitioner, James Glenny, and his sponsors should be informed that nothing more could be done as their Lordships have 'no other means whereby a proper Investigation thereof can be made'.[27]

Six years later, when the inventor of 'a substitute for wool and Cotton' attended the board, 'My Lords proposed to him to refer this Invention to the Examination of the Society of Arts and Manufactures, when he [the inventor] objected to any Trial of the same by Chemical process and said he meant to apply for a patent'. Samuel More, who was also in attendance, pointed out to their Lordships that the Society could not 'enquire into any Discovery for which the Inventor intended to apply for a patent'.[28]

(*To be continued*)

D. G. C. A.

1. L.A., C2/40. S. Cottrell, 1790; B.T. 5/6, 30th March, 1790.
2. D. G. Barnes, *A History of the English Corn Laws from* 1660–1846 (London, 1930), p. 10.
3. Ibid., p. 54.
4. Soc. Min., 31st March, 1790.

5. Min. Comm., Agriculture, 12th April, 1790.

6. Ibid., 19th April, 1790. See also L.A., C2/111. Ball; C2/92. B. Collier; C2/37. P. Merchant; C2/38. J. Nickolls; C2/95. J. Rondeau; 1790.

7. Soc. Min., 28th April, 1790. See also L.A., C2/93, Hawkesbury, 1790; C2/41. Secretary, More, 1790.

8. 31 George III, c. 30.

9. James Louis Desormeaux (1745–1815), citizen and dyer of London (information supplied to Miss N. K. A. Rothstein of the Victoria and Albert Museum by Mr. Walter Saunders Taylor).

10. BT5/6, 3rd Feb., 1790. For Cashew gum see F. N. Howes, *Vegetable Gums and Resins* (Wallham, U.S.A., 1949), pp. 62–3.

11. *Transactions*, Vol. VI (1788), p. 339.

12. Ibid., Vol. IX (1791), p. 171; Soc. Min., 23rd Dec., 1789.

13. BT5/6, loc. cit.

14. Min. Comm., Colonies & Trade, 20th April, 1790.

15 BT5/6, 10th May, 1790.

16 J.H.C., Vol. XLV, pp. 493, 496, 543; 30 George III, c. 28; *Transactions*, Vol. VIII (1790), p. ix.

17. BT5/6, 1st May, 1790.

18. Min. Comm., Chemistry, 18th May, 1790; L.A., C2/103. W. Fawkener, 1790.

19. BT5/6, 31st May, 1790; L.A., C2/104. B. de Bonneuil, 1790; Min. Comm., Chemistry, 23rd Nov., 1790.

20. Presumably the son of Boyle Godfrey, the Alchemist. See *Dictionary of National Biography*.

21. BT5/6, 10th May, 1790.

22. L.A., C2/96. W. Fawkener, 1790.

23. Soc. Min., 19th May, 1790; Min. Comm., Manufactures, 9th Nov., 1790.

24. Ibid., 9th Nov., 1790; Soc. Min., 24th Nov., 1790; L.A., C2/87. W. Fawkener (addressee), 1790.

25. L.A., C2/88. N. Brooke, 1790; W. G. Hoskins, *Industry, Trade and People in Exeter* 1688-1800, *with special reference to the Serge Industry* (Manchester, 1935), p. 81.

26. Soc. Min., 23rd Feb., 1791; BT5/7, 28th Jan., 1791; BT3/3, 22nd Feb., 1791; L.A., C3/145, 147-8. J. Glenny, 1791.

27. BT5/7, 24th March, 1791.

28. BT5/10, 13th April, 1796. The inventor's name was Le Texier.

OBITUARY

We record with regret the death of the following Fellows of the Society.

MR. WALTER BEECROFT

Mr. Walter Gordon Beecroft, who made notable contributions to the life and amenities of Southend-on-Sea, died at Rochford, Essex, on 6th March, aged 76. A solicitor by profession, Beecroft had practised for more than fifty years in Leigh. His private interests centred upon the arts, and he took a leading part in the affairs of a number of local cultural societies, acting as honorary solicitor to several of them. Outstanding amongst his benefactions to the neighbourhood was the creation of the Beecroft Art Gallery. He gave the sum of £25,000 for the purpose of establishing and equipping the gallery, was an unfailingly generous subscriber to its Purchase fund and himself presented several works of art to the collection.

Beecroft was elected a Fellow of the Society in 1948.

MR. G. S. SANDILANDS

Mr. George Sommerville Sandilands, Hon.A.R.C.A., the well-known art critic and journalist, died on 6th June, aged 72. A Scotsman by birth, he was educated in Glasgow and at University College, London. After service with the army in the First World War he became Secretary of the Faculty of Arts French Institute until 1939, when he was appointed Registrar of the Royal College of Art, a post which he held for 10 years. From 1956–8 he was Chairman of the Governors of the St. Martin's School of Art.

A gifted and fluent writer, Sandilands was art critic of the *Daily Herald* from 1928–39 and subsequently of *The Scotsman*, and was a regular contributor to *The Studio* and other London periodicals and newspapers. He published several books on English water-colour painting, notably a study of the art of the late Sir Frank Brangwyn, and was himself an accomplished painter whose work had been widely exhibited. In addition to his writing (which included poetry and plays) and administrative preoccupations, he took an active interest in politics and public affairs. He twice stood for Parliament, and was for several years a member of the Ealing Town Council.

Sandilands was elected a Fellow of the Society in 1951, and thereafter on various occasions he contributed reviews of art exhibitions to the *Journal*.

NOTES ON BOOKS

TOWARDS UNIVERSAL MAN. *By Rabindranath Tagore. London, Asia Publishing House,* 1961. 30*s net.*

This book has been published simultaneously in India, Britain and the United States on behalf of a specially constituted Tagore Society which was given a grant for the purpose by the Ford Foundation. It was planned, more than two years ago, as a commemorative volume to be issued in connection with the centenary of Rabindranath Tagore's birth, which fell on 6th May last.

Without derogating in any way from the merits of the numerous other publications which have appeared in connection with the same occasion, I believe that this book deserves to be put in a class by itself, and this for two reasons. First, it reveals to the English-reading world an aspect of Rabindranath's social activities which has, until it appeared, been known only to those capable of understanding his own Bengali medium; secondly, it effectively relates these activities to his universally-acclaimed achievements as poet, novelist, dramatist, lyricist, musician and painter. In short, it completes the picture which the Western world has formed of Tagore by bringing in those elements of his personality which account so largely for the reputation which he enjoys in the estimation of his own countrymen.

To Westerners like myself, who were privileged to come into contact with Tagore only on rare occasions, it was at first something of a puzzle to account for this reputation. True, his artistic achievements were such as to fill with justifiable pride any land which might have been privileged to give birth to him; but in an era when a political career was almost the sole avenue to national prominence, his refusal to take any part at all in current politics might have seemed equivalent to voluntary incarceration in an ivory tower of his own construction. Certainly, the tower was very beautiful; it deservedly won the admiration of the world. But it seemed, at first sight at least, to isolate its inhabitant from the throbbing currents of nationalism which were infusing a new life into a reviving India. Yet in fact there was no such isolation as might have been expected; Rabindranath was not cut off from his fellows any more than they were cut off from him. The apparent contradiction existed only in the mind

of the Western observer, who failed to appreciate the essential part which the Teacher-Seer has always played in the complex structure of Hindu social organization. It is the proper function of the Teacher-Seer to dwell in the surroundings in which his genius can function and from these surroundings to exhort, to advise, to inspire, his fellow men. If he does not go to them, they can come to him; the essential thing is that he constitutes, as it were, the conscience of his nation, the embodiment at once of ancient wisdom and of modern requirements.

This is a side of Rabindranath's career which is far less known abroad than it is at home; to ignore it is to miss one of the main reasons why the centenary celebrations of his birth have been taken so seriously by his countrymen. After all, India has given to the world many great writers, poets and painters, to say nothing of many great philosophers. Yet there is only one Rabindranath, for the reason that at the height of the nationalist tide, he fulfilled the function of the *Guru* of Hindu tradition, calling upon Indians to be true to themselves and to their own best traditions; to stand erect upon their own feet; to show the courage to choose, to select, to discard the components out of which their reborn nation fell to be constructed.

The eighteen essays in this book, selected by competent judges out of the great mass of Tagore's writings, reveal Rabindranath to the Western world as something that his countrymen have always known him to be—one of the greatest pioneers of contemporary social, educational, political and economic reform. His influence upon the shape which India to-day has assumed is so great as to be almost incalculable; indeed many of the principal outlines of this shape can be confidently discerned in the writings collected between the covers of this volume. If Gandhi's asceticism captured India's heart, Rabindranath's thinking captured her intellect. For this reason, no student of contemporary India can afford to miss so important a book.

L. F. RUSHBROOK WILLIAMS

BRITISH INDUSTRY: CHANGE AND DEVELOPMENT IN THE TWENTIETH CENTURY. *By J. H. Dunning and C. J. Thomas. London, Hutchinson,* 1961. 30*s net*

The purpose of this book is to describe the effect on the economy of developments in the structure and technique of British industry. It does not tell the story of particular industries, except for fuel and power and a little about man-made fibres, plastics and petrochemicals; still less does it tell the story of particular firms. It dwells at the level of generalities, of broad statistical returns and overall trends. But the approach is an important one; this is industrial change as seen from the point of view of someone who is conscious of great scientific and technical events. Therefore much attention is given to the rôle of research and development—the organized effort to innovate, which has become so important in the last fifteen years—and to the impact of new materials and of new techniques, such as automation. Changes in social habits are barely mentioned, but the important changes in the framework of State assistance, control and ownership are discussed, and there is also a chapter on the effect of international economic development.

Even with this limited field, there is a tremendous mass of facts to be compressed into 232 pages, and the reader may well feel somewhat breathless as he is impelled from one statistic to another. Also, of course, the statistics and the facts soon become out of date; thus, in Chapter IV, several of the facts about the Research Councils and their work have been left behind by the remarkable increase in this part of the Government's effort. The reader must also be warned that brief descriptions are liable to mislead; thus it is exceedingly difficult to know what meaning to attach to the data on the supply of scientists in Britain, the United States and Russia, quoted on page 137. These are difficulties inherent in the authors' material, and they have done their best to overcome them.

In the half-century after 1907, the vehicle industry expanded its employment by

nearly 1,000 per cent (and its output by much more): chemicals expanded by 226 per cent, but textiles and clothing both fell by a quarter. The engineering industry now provides as big a proportion of industrial employment as the textile industry did in 1907. Manchester, still popularly believed to depend on cotton, is in fact a centre of chemicals, aircraft, electronics and the newer branches of engineering. In all this there is the excitement of industrial change which is still continuing and accelerating. Dr. Dunning and Mr. Thomas have written about a period which deserves at least as much study as the period of Arkwright and James Watt and George Stephenson. Perhaps they will stimulate their readers to look at the history being made around them.

C. F. CARTER

MODERN PUBLICITY, 1960-61. *Edited by Wilfrid Walter.* (*Art Editor, Ella Moody.*) *London, The Studio,* 1960. 45*s. net*

It is always exciting to get the new volume of *Modern Publicity*. This famous annual of international advertising art succeeds in showing effectively the work of 28 countries carried out during 1960. The current volume is interesting also in that it includes work not only from the Soviet Union, but also from Poland, Hungary, Czechoslovakia and Yugoslavia.

The editors are to be congratulated this year on improving the *mise-en-page*. By this I mean, in my memory of previous years, there were too many examples included—resulting in small and crowded reproductions. This year the layout of the various pages is more considered, and shows off the exhibits to better advantage. Also the credit captions are more clearly set out, and more easily related to the examples to which they apply.

There is no question that volumes such as *Modern Publicity* are an indispensable stimulus to many people: not only in inspiring students all over the world, but also in keeping practising designers up to date, as well as informing the enlightened businessman of successful advertising trends.

The successful trends to-day are well demonstrated by the current issue. One's attention is drawn to the growing ubiquity of the international solution to graphic problems. As in modern architecture, where the one-time regional forms become more international and more alike as each year passes, so it is the same now in modern art and design. It is not surprising therefore that the influence of these arts is echoed in the work of the graphic designer in the various fields of advertising expression. Unquestionably, regional forms of expression are slowly dying. Perhaps this is a good thing. In any case, the international idiom seems to have come to stay. While *Modern Publicity* shows this idiom at work, it is interesting to see the great diversity of ideas, and to compare the ingenuity of hundreds of designers in solving what have, perforce, become similar merchandizing problems throughout the world.

From the editor's foreword one reads that there are over 400 examples in black and white, and I counted myself 46 illustrations in full colour, and 33 in two colours. In other words, there is a rich showing of work from all over the world—well reproduced and clearly credited. The many examples are drawn not only from the hardy annuals of poster and press advertising, but also from TV advertising, direct mail and showcards. In addition, there are a variety of exhibits of packaging and labels, and the comparatively new activity which designers love—that of the record sleeve—is also well demonstrated in the volume. All this is topped off by a good showing of international trade mark designs.

This new volume of *Modern Publicity* can be recommended as a feast, as well as an education, for all those interested in the application of good design in the creative solution of advertising problems.

ASHLEY HAVINDEN

SUBSUNK. *By W. O. Shelford* [*Captain, R.N.*(*Retd.*)]. *London, Harrap*, 1960. 18*s net*

Subsunk takes its title from the name of the operation brought into force when a submarine is overdue. As soon as the emergency signal is received, a comprehensive organization involving ships, aircraft, salvage vessels and divers goes into action in the area in which the missing boat was operating to locate and rescue the submarine and her crew.

The sinking of a submarine in peacetime is, fortunately, a rare occurrence, but on the occasions when it has happened public attention has been riveted on an agonizing suspense story which has all too often ended in tragedy.

Why ninety-nine lives were lost in *Thetis*, when for over seven hours part of her hull was visible above the water, and how it was possible for fifty-seven men to die of drowning and exposure after escaping from *Truculent* in the busy waters of the Thames Estuary are questions the layman may well ask. He will find the answers in this book.

The author, who was in charge of Submarine Escape training during the greater part of the last war and whose subsequent career has been intimately connected with this endeavour, tells its story against a background of the development of the submarine itself. He gives a clear and authoritative picture of the many difficulties which have had to be faced and surmounted to provide the most simple and effective means of getting out of a sunken submarine and, equally important, of ensuring that a highly efficient organization for the rescue of survivors and salvage of the boat can be brought into action with the minimum delay.

The submariner is exposed to various hazards of which the nature of his craft and enemy action are only two. Her low silhouette often makes a submarine on the surface difficult to see; the not unnatural suspicion with which the surface mariner or airman regards any submarine he sights in wartime, the difficulty of escape, even when on the surface, due to the smallness of the hull openings and even the unwillingness of other ships in the vicinity of a submarine accident to start a 'panic'—have all led to loss of life.

Broadly speaking, there are two means by which the crew of a sunken submarine can be rescued. Either an attempt can be made to bring the boat to the surface (Rescue by Salvage) or the crew can escape from the wreck whilst she is on the bottom (Individual Escape).

Many lives have been lost because the former method was tried, and realization that salvage was impossible was not reached until the carbon dioxide content of the atmosphere in the boat had reached danger level, rendering all or a large proportion of the ship's company unfit to escape. However, with the successful use of the Davis Submerged Escape Apparatus in the *Poseidon* disaster in 1931 the Admiralty decided that the crew of a sunken submarine would be expected to save themselves by Individual Escape. This policy is still followed, although 'Free Escape' without breathing apparatus has superseded D.S.E.A.

A third means of escape, by 'Rescue Bell', is used by the United States Navy. The bell, which is lowered on to specially adapted hatches in the submarine was very successfully used in saving the crew of *Squalus*, which sank off the New England coast in 1939. The author gives the Admiralty's reasons for not adopting this system in the Royal Navy, and whilst the reader may not entirely be convinced he will agree that no two submarine accidents are likely to be exactly similar and that the method favoured in this country offers the best chance of survival in most circumstances where it is possible to escape from a sunken submarine.

Captain Shelford's book will be found absorbingly interesting by all submariners, past and present, but it is never too technical to be enjoyed by the general reader.

E. W. CLUBB

SHORT NOTES ON OTHER BOOKS

BRISTOL IN THE 1890s. *By Reece Winstone. Bristol, Reece Winstone*, 1960. 10*s*

The farther back into the pictorial history of Bristol that Mr. Winstone's collections go, the more valuable they become. The 185 photographs included here vividly evoke a vanished way of life. Of special interest are those recording Queen Victoria's visit to the city in November, 1899, and the Industrial and Fine Arts Exhibition of 1893.

ALPHABET THESAURUS: A TREASURY OF LETTER DESIGNS. *New York, Reinhold*, 1960. (*London, Chapman & Hall.* 80*s net*)

This collection includes examples of over 3,000 different alphabets, together with many derivatives, arranged according to style, relationship and visual significance. The book is produced by the photo-lettering process, and is a striking advertisement for its powers in display composition.

TOWARDS A UNIFIED COSMOLOGY. *By Reginald O. Kapp. London, Hutchinson*, 1960. 35 *net*

This book sets out the author's 'Hypothesis of the Symmetrical Impermanence of Matter'—a theory of continuous origin and extinction of matter—which he has developed during some thirty years of observation and reflection, and which he argues can explain such phenomena as the origin and rotation of the spiral nebulae, stars and planets, gravitation and the nature of elementary particles.

A GUIDE TO PREHISTORIC ENGLAND. *By Nicholas Thomas. London, Batsford*, 1960. 30*s net*

The greatest part of this volume is devoted to a gazetteer giving detailed information on every important ancient site in England, arranged by counties. There are a glossary of archaeological terms, a bibliography, an index to sites mentioned, and 70 illustrations.

BOTTICELLI AND HIS CONTEMPORARIES. *By Angela Ottino della Chiesa. London, Batsford*, 1960. 63*s net*

An attempt to cover the work of the great fifteenth-century Tuscan painters; with 92 plates in colour.

THE NATIONAL GALLERY, LONDON. *By Philip Hendy. London, Thames & Hudson*, 1960. 28*s net*

The Director of the National Gallery has written an account of the genesis and growth of the collection, and extensive notes on over 100 paintings reproduced in colour. In addition, there are a large number of small black and white reproductions.

THE FASHIONABLE LADY IN THE NINETEENTH CENTURY. *By Charles H. Gibbs-Smith. London, H.M.S.O.*, 1960. 25*s net*

Systematically arranged groups of fashion plates and artists' impressions illustrating changes of style in both day and evening dress at every fifth year throughout the century. The emphasis is expressly upon the smart, and not the average, mode. Stylishly produced, and including a short bibliography and list of sources.

FROM THE JOURNAL OF 1861

VOLUME IX

THE INTERNATIONAL EXHIBITION IN PROSPECT

5th July

The following is the translation of a letter, addressed to Lord Granville, and received by Her Majesty's Commissioners*:

Berlin, 18th June, 1861

My Lord,—I have the honour to acquaint your Lordship that I have undertaken the direction of a Commission, appointed to represent the interests of Prussian manufacturers at the Universal Exhibition of Art and Industry, to be held in London in the spring of next year, and to enter into correspondence with the Commissioners of her Majesty the Queen.

The idea of affording to the nations another opportunity of showing their industrial progress, seems to me very happy and opportune; and I conceive that there is every cause for gratitude to those who first conceived it, and have taken upon themselves the labour of carrying it into execution. The modifications of tariffs among European nations, which have lately been made, or may shortly be expected—modifications most important to trade, and the promotion of which confers the greatest honour upon Great Britain and her enlightened statesmen—will, no doubt, have great influence upon the exchange of goods, and materially add to the range of commerce. Under these circumstances, the Exhibition will assume the character of a great fair, calculated to create new commercial relations and to extend those that exist. Hence, apart from the advantage of instruction, it will afford considerable substantive advantages to those who take part in it, and will, doubtless on this account, find all men eager to participate. I am convinced that the Prussian manufacturers will appreciate the importance of the undertaking. . . .

With especial esteem,

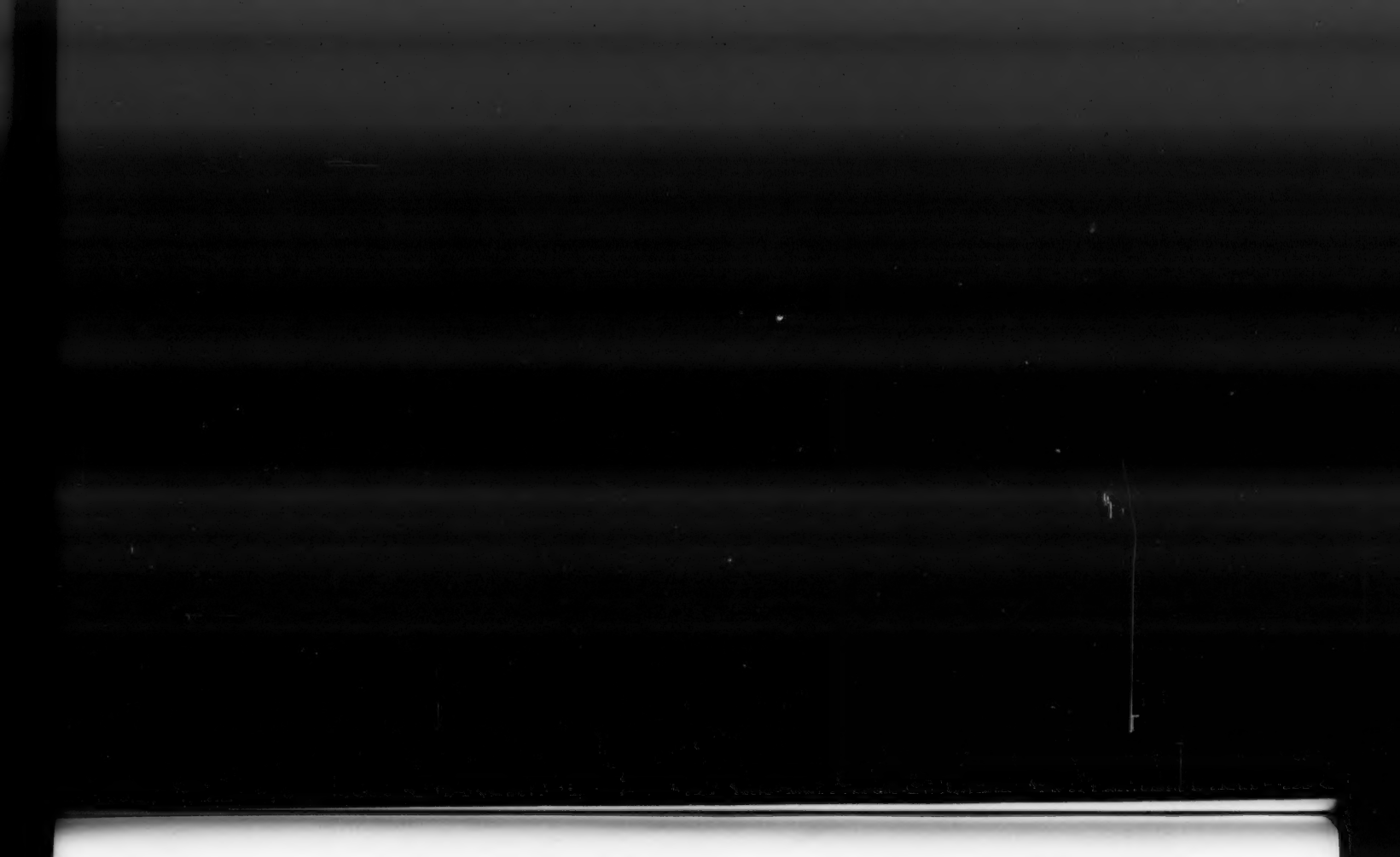
(Signed) Frederic William,
Crown Prince of Prussia

12th July

The Committee of the Basingstoke Mechanics' Institution, with a view to enable the working classes of the town and neighbourhood to provide, by small weekly payments, the means of going to London to visit the Great Exhibition proposed to be held during the summer of 1862, have resolved to establish an "Exhibition Travelling Fund Club" in connection with the Institute, subject to the following rules, viz. . . .

That the full deposit of each member shall not be less than 5*s*., to be paid by weekly contributions of not less than one penny. . . .

Any member leaving the town, or being unable from sickness, or other reasonable cause, to continue his or her deposits, shall be entitled to receive the amount he or she has paid in, subject to a small deduction (to be decided by the Committee) towards the expense of printing and other charges.

That none but subscribing members to the "Exhibition Travelling Fund Club" shall be allowed to participate in any special advantages obtained by the Committee from the railway authorities . . . neither shall the tickets issued by the Committee be made available for any other purpose than visiting the proposed Exhibition.

* Appointed by the Society.